

# THE MEDICAL NEWS.

A WEEKLY JOURNAL OF MEDICAL SCIENCE.

VOL. XLVIII.

SATURDAY, MAY 15, 1886.

No. 20.

## AMERICAN MEDICAL ASSOCIATION.

THIRTY-SEVENTH ANNUAL MEETING, ST. LOUIS, 1886.

### THE ADDRESS IN MEDICINE.

*Delivered May 5, 1886.*

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### SOME POINTS IN BACTERIOLOGY.

"Vere scire est per causas scire."—BACON.

THERE are three planes in the history of medicine. The first is the study of the symptoms or appearance of disease. It is the period of the infancy of medicine. It is naturally the most crude period, and all irregular medicine still rests upon this plane. It gave us a pharmacopœia, and the highest expression of it made of the practice of medicine an art. The second plane begins with the observation of the effects or lesions of disease. It made us familiar with the natural history of disease, and thereby nearly destroyed the pharmacopœia. The third is the present plane, upon which is being prosecuted investigations into the cause of disease. Investigators have just set foot upon its threshold. When it shall have been fully attained, medicine will be entitled to a place among the sciences which are called exact.

The progress made in this direction during the past year so completely overshadows all other work in range and promise of practical value as to justify in this report, to exclusion of everything else, a brief review of the conclusions reached.

The etiology of acute infections is comprised under the single term

#### BACTERIOLOGY,

the bacterium having come, in the course of time, to include all pathogenic as well as many innocent microorganisms.

The conclusion reached by the mycologists of the present day is that, under natural circumstances, microorganisms show themselves, as a rule, not with variations, but in permanent forms, but that disease is not produced so much by a distinct and definite form as by a distinct and definite germ.

On the other hand, most pathogenic microorganisms are indigenous to certain definite places. These are the epidemic germs. Thus, the mouths of the Ganges and Brahmaputra are the centres of cholera, Lower Egypt of the plague, the Antilles of yellow fever, Ireland of typhus. But just as plants of higher organization may be transplanted to other soils, so may original endemics assume epidemic and finally pandemic proportions or extent. Thus, smallpox first showed itself in Germany in 1493, an importation from the Netherlands, but it was not until 1527 that it was transported to our continent, making its appearance with wholesale slaughter

in Mexico, and gradually extending thence over the whole of North America. Scarlet fever, which was first heard of in Arabia, was not seen in our country till 1735. It reached Iceland in 1827, South America in 1829, Greenland in 1847, and Australia in 1848. Measles had not been carried to Australia up to the beginning of our own decade. Cerebro-spinal meningitis, in all respects the most irregular of all epidemic diseases, first sprang up in Geneva, and first fell upon our country in 1806. Cholera was unknown with us until the memorable year of 1832. Even tuberculosis, which has long since assumed pandemic extent, was, as Liebermeister has shown, not originally ubiquitous, as it remained unknown to our own Indians, to the aborigines of Australia, and the negroes of Central Africa until carried to them by more civilized races. There is, therefore, no longer question of the spontaneous, or so-called autochthonous, origin of infection. Typhoid and typhus fevers, dysentery, and diphtheria, pyæmia, erysipelas, and puerperal fever, appear only at times when lurking germs and spores from previous cases find favorable conditions for development or after fresh importations of the disease.

The introduction into the blood of a specific germ begets the specific disease, and the fact that each one of the acute infections has always presented the same characteristics proves conclusively that no change has occurred in the properties or peculiarities of the specific cause. For so long as observations have been recorded, measles, for instance, has always been the same disease, with the same period of incubation, the same prodromata, and the same eruption, the same complications, and the same termination. New interpretations of the phenomena of the acute infectious diseases have been made from time to time, more searching means of study have developed new signs, but the characteristic features of each of the acute infections have always remained the same. The accurate observations rendered possible by the adoption of the solid culture soil are in thorough accord with these conclusions. The essential nature of pathogenic bacteria is not changed by alterations in the soil or other surroundings. Bacteria may be shrivelled or dwarfed or reproduction checked by lack of oxygen, unsuitable nutrition, improper temperature, but they may not be changed in nature. Up to the present time, it has been found impossible to convert innocent into pathogenic forms, and the observations recorded which seem to lend support to the transmutation theory, as by Büchner, Bastian, Nägeli, and others, have been shown to rest upon inaccuracies or impurities.

#### ATTENUATION NOT CHANGE OF NATURE.

But the case is very different with the converse of this view, which opens up one of the most interesting studies in mycology. Is it possible to deprive the pathogenic forms of their pathogenic properties? The belief is still maintained, by some clinicians at least,

that vaccinia is smallpox which has lost its virulence by passing through the body of a cow, and the question of attenuation of the so-called virus of virulent disease, with the view of inoculating it in milder forms, occupies the attention of prominent mycologists at the present time. Within the present decade this question has been answered in the affirmative with reference to the virulent bacteria of charbon. For it has been discovered by Pasteur and by Koch that under the influence of high temperature and various chemical agents, the bacteria of charbon may be made to suffer loss of their pathogenic properties, while they still retain all other characteristics, including the capacity of reproduction. Pasteur claims to have effected the same attenuation in the case of hydrophobia. But these observations do not support the view that any change of nature has been experienced in this way. Bacteria thus treated are not changed into innocent forms. They have simply lost the physiological property of infection. Baumgärtner puts it pertinently when he says it is not a question of changing poisonous into innocent snakes, but of extracting the poison fangs from animals which otherwise remain the same.

#### THE MORPHOLOGY OF BACTERIA

is not simply a question of size and shape. The term is extended to include also motion, color, and affinity for color, as well as the manner of growth or disposition of the colonies. In many cases such distinctive peculiarities are already demonstrated as to render it possible absolutely to diagnostic disease in life by one or more of these points. As Hueppe says, this is the most interesting question for the clinician. May we make a differential diagnosis from morphology alone?

Bacteria vary greatly in both length and breadth, but are, for the most part, so small as to be on the confines of the visible with the microscope. In fact, it is chiefly by reason of the recent improvements in the illumination and amplifying power of the microscope, the oil immersion lens, and Abbe illuminating apparatus, that they have been rendered visible at all. Some of them are to be seen only with a power of 700 diameters, which is the amplification generally used in the study of all microorganisms. Mycologists speak of micro-, meso-, and megacoccus, of the micrococcus prodigiosus, and of the bacillus subtilis, but these are all, of course, relative terms. Pathogenic microorganisms vary in length from 1 to 40 mikromillimetres, and in breadth from 0.5 to 7 mikromillimetres. Many micrococci are too minute to admit of any accurate measurement. The largest microorganism is the spirillum, which may reach the length of 0.2 of a millimetre. Perhaps a better idea of size can be conveyed by comparison with a familiar object. The bacillus tuberculosis, which occupies in respect to size a median place, varies in length from  $\frac{1}{1000}$ th to  $\frac{1}{500}$ th of an inch, the smaller measure being the average diameter of a corpuscle of human blood.

Although some distinction may be made between pathogenic and innocent organisms by their size and shape, the most skilful mycologist would hesitate to express an opinion based on these points alone. But microorganisms may look alike and yet be very different. Spermatozooids of different animals may present the same

general appearance, but they are endowed with very different properties. We remain as yet at too great a distance to make out the distinguishing features even of innocent and dangerous microorganisms. As Birch-Hirschfeld remarked, it would be impossible to declare of a man standing on the spire of the Strassburg Cathedral, whether he was black or white, and even the same configuration in every particular would furnish no more definite criterion than in the case of full-grown serpents of the same appearance some of which only are poisonous. We await now with interest the revelations which are to follow the experiments with the new lens worked out by Prof. Abbe, which, it is claimed, already exhibits differences in the structure of bacteria.

The general construction of bacteria, so far as it can be studied, is simple enough. Bacteria are cells because they are constituted, grow, and divide like cells, and although nuclei have not yet been discovered in them, they are in this regard not unlike other low forms of vegetable cells. The protoplasm of the cell seems homogeneous in the minutest, but more or less granular in the larger and more distinctly visible forms. It shows the same reactions and takes up the same colors as other protoplasmic bodies, differing, as they do, in different forms. The cell is invested with a membrane which may be separated from the protoplasm by agents, like the alcoholic solution of iodine, which shrink the protoplasm. The membrane assumes prominence also at the period of spore formation. It is in most cases firm and closely apposed to the contents, while in the spirochætae it is extensible and elastic. Dark, transverse lines forming across the protoplasm indicate the division of a bacterium into daughter cells, which separate in the process of reproduction. Hence the name schizomycetes. A billiard ball, a lead-pencil, and a corkscrew indicate in the homely comparisons of de Bary the chief varieties of bacteria as micrococci, bacilli, and spirilla.

#### DISTINCTION OF BACTERIA.

A glance would reveal the difference between a bacillus and a spirillum, and there could be no question of mistaking a micrococcus for either. In many cases even gross morphological resemblances could create no embarrassment in the mind of the practitioner. What possible doubt could exist, for instance, as between the comma-bacillus of the stools and intestinal contents of cholera and the innocent comma-bacillus found in the mouths of healthy people? The condition of the patient decides it at once, or if there could still be a doubt, it would be dissipated with a knowledge of the fact that the cholera bacillus is not found in the mouth. But in many cases differences in form alone are too slight to be recognized by the clinician. In some cases these differences can be seen. Thus, the slight deviations between the forms of the bacilli of milzbrand and malignant œdema enable mycologists to separate diseases which are often confounded. But these distinctions may be made out only in the laboratories of experts. Hence, for practical use, appeal must be made to other factors in morphology. Thus, the bacilli of tuberculosis, syphilis, and leprosy closely resemble each other—that is, closely to the clinician, though coarsely to the mycologist. But the tubercle bacillus distinguishes itself from all other bacilli save one, by two peculiarities: first, lack

of affinity for all dyes—that is, the resistance it shows to colors; and, secondly, when it is colored with alkaline dyes, by the persistence with which it retains its color in the presence of mineral acids. This persistence is shown only by the bacillus of leprosy, but the bacillus of leprosy may be differentiated by the fact that it may be colored with Weigert's nucleus color (hæmatoxylin, alcohol, alum,  $\text{aa}$  2 parts; distilled water, glycerine,  $\text{aa}$  100 parts), which has no effect upon the bacillus tuberculosis. The colored bacilli of syphilis are decolorized by mineral acids. By the method mentioned, Gaffky discovered characteristic bacilli in the sputum of tuberculosis in 938 of 982 cases.

Considering the fallacies of the observations, and the stage of prephysical signs, it is safe to say that the time is close at hand when we shall no longer think of using the pleximeter and the stethoscope in the diagnosis of tuberculosis.

Only a skilled mycologist would detect the fine differences in morphology of the bacilli of cholera and cholera morbus, but any one would notice at a glance the difference in the funnel and cone or stocking-shaped colonies of the two varieties. As, however, the length of time that must necessarily elapse to make this observation precludes its practical value to clinicians, quicker conclusions can be reached by the physiological test—that is, the introduction of the germs, or matter containing them, into the stomachs of guinea-pigs. These animals are very susceptible to cholera morbus, but insusceptible to true cholera, without special preparations or precautions. Perhaps this test would be resorted to only in cases where doubt existed as to the commencement of an epidemic of Asiatic cholera.

The method in which the bacteria aggregate themselves in the process of growth in the culture soil, the process of colonization it would be called in the tissues of the body, or

#### THE FORMATION OF ZOÖGLÆA,

furnishes some, but uncertain information regarding the nature of the germ. Cohn thought at one time that the whole class of bacteria might be divided into two distinct species, one of which formed a mucus-like mass, the other fibrils or threads. These classes he proposed to designate as gleogenous or mucus-forming, and nematogenous or thread-forming families, but he was compelled subsequently to abandon the idea on observing the changes in the mode of growth in different soils and at different temperatures. Thereupon Koch observed that the formation of zoöglæa in the form of membranes or fibrils, squamous, dendritic, fenestrated, nodular, globular, circular, etc., immediately preceded the development of spores. Both Cohn and Koch soon reached the conclusion that while the form of the colony might serve to separate families and groups, estimates based upon such observations must be accepted with much reserve. But while it is admitted that the form of the zoöglæa varies in different soils, it is nevertheless true that a typical form is shown under the same conditions, a fact which Hueppe remarks, essentially lightens a differential diagnosis. To give but one example, the bacillus anthracis may be macroscopically distinguished from the non-parasitic bacillus subtilis by the fact that the anthrax bacillus forms in its soil a floccu-

lent deposit, while the bacillus subtilis develops a dry membrane upon its surface.

The development of bacteria does not differ from the higher vegetations in requiring the necessities of life: food, heat, oxygen, water, etc.

The question of food is connected with the subject of cultivation in the so-called

#### PURE CULTURE SOILS,

which consists in selecting the food best adapted for the rapid multiplication of microörganisms. The fact that bacteria remain sterile in certain soils and luxuriate in others, does not surprise us when we reflect upon the predilections of higher forms of vegetation.

While, then, many bacteria may be cultivated in almost any kind of culture soil, they differ in the degree of development according to the nature of the soil. Thus Wilkommen has observed that the germs which thrive upon the South American potato cannot be made to grow upon the European potato. The microörganisms which give the peculiar piquancy to Stilton and Roquefort cheese grow better in certain cellars than in others. The first experiments in cultivating bacteria were in fluids, solutions of meat, beef-tea, chicken soup, malt extracts, infusions of hay, etc., but fluids are open to the objection that they admit other germs, to coalesce with and render impure the special variety to be studied. Pure cultivation became possible only with the use of the pure culture soil first employed by Koch. Germs falling upon a solid surface remain fixed in the same place. The solid culture soil made practicable the absolute isolation of germs, without which accurate investigation is impossible. Koch made his first studies with the common potato. The potato was the key to the whole subject of solid cultures. We might say that what the apple was to Newton the potato was to Koch. Subsequently gelatine was employed, then aqueous humor, then gelatinized meat preparations, peptonized gelatine, etc., and as a climax for the epicures, gelatinized blood. Thus has been determined the peculiar soil in which the varieties of pathogenic bacteria thrive the best. Thus while the bacilli of both forms of cholera develop upon both animal and vegetable soils (both being really exanthropic germs), the bacilli of tuberculosis will not grow in a vegetable soil as upon the surface of a potato, but will thrive in infusions of meat and luxuriate in the serum of the blood. The micrococcus of chicken cholera grows to swarms in neutralized chicken soup, and the comma-bacillus, which is really not a bacillus, but a form of vibrio or spirillum, develops in such luxuriance in alkaline meat soups as to have enabled Schottelius to detect it in minimum amount. In such cases, where but very few or doubtful specimens were present in the intestinal contents, Schottelius added to the contents two and a half times as much slightly alkalinized infusions of meat, or ten times as much gelatinized meat peptones. In this mixture, preserved uncovered in a warm place at a temperature not above  $40^{\circ}\text{C}$ ., cholera germs developed in myriads within twelve hours. In this connection a remark may be made upon the

#### EFFECT OF BACTERIA UPON THE FOOD

selected, foreshadowing the local effects of microörganisms upon the tissues of the body in the so-called local



symptoms of disease. It is observed and distinctly tabulated if the gelatine or other food be liquefied, granulated, colored, decomposed, with or without the development of odors and gases, and the time required to induce these changes. Thus have mycologists made us familiar with characteristic features of the vibrios of both forms of cholera, which liquefy gelatine, while the micrococci of pneumonia have no such effect; have pointed out the nail cultures of pneumonia, the air vesicles of Asiatic cholera, the flat scales of tuberculosis, the fern leaves of the micrococcus of erysipelas, the acacia leaves of one form of the micrococci of pus. So also the effect of puncture or stick cultures show peculiarities different from plate cultures, and different effects are observed again with the same bacteria in different kinds of soil or food. Eisenberg has recently (Hamburg and Leipsic, 1886) published a *Bacteriologische Diagnostik*, which consists of a series of tables wherein are noted, in a form of inestimable value to the student of bacteriology, the peculiarities of all known germs.

#### CONCERNING TEMPERATURE.

Three cardinal points are recognized of the temperature: the maximum, the minimum, and the optimum. The optimum is the temperature most conducive to fructification, to spore formation. Excesses in either direction arrest certain processes, extremes destroy life. As might have been premised, non-parasitic enjoy much wider latitude than parasitic germs. Thus, according to Cohn, the bacterium *termo* grows between 5° and 40° C., with its optimum at 30° to 35° C.; while the border temperatures of the bacillus *tuberculosis*, according to Koch, are 28° and 42°, with an optimum at 37°, the temperature of the human body. The conjoined influence of soil and temperature is shown in the conduct of certain bacilli (*tyrothrix*) found in cheese. The optimum temperature of this germ is 25° to 35° C. In a neutral fluid they are killed by a temperature of 90° to 95° C., while in a weak alkaline fluid they live at over 100° C. The mature spores of this species remain productive in a weak alkaline fluid after being boiled at a temperature of 115° C. *Tyrothrix filiformis* survives, in milk, a temperature of 100° C., a degree fatal in one minute in an acid fluid. The spores of this species survive in milk a temperature of 120° C., while in gelatine they are destroyed at 110° C. This knowledge of the range of temperature gives a differentiation at once of parasitic from non-parasitic bacteria, as germs the range of which is limited to 28° to 42° C. may not constantly find anywhere upon earth, outside of animal bodies, the necessary means of existence.

Such differences prevail regarding the

#### NEED OF OXYGEN,

that Pasteur separated all microorganisms into two classes, aerobes and anaerobes. As, however, all known pathogenic microorganisms must have oxygen more or less, the division is of more value to the mycologist than to the clinician. One point in this connection regarding the ammoniacal degeneration of urine is of interest to the practitioner.

#### BACTERIA OF URINE.

This degeneration, as is well known, results from the conversion of urea by the absorption of water, into the

carbonate of ammonia, during which process the originally clear fluid becomes cloudy and opaque. A drop of this urine under the microscope discloses myriads of germs of all descriptions. Cohn has shown that one of them, the micrococcus *ureæ*, is the prime cause of the ammoniacal change. Pasteur had already discovered that this micrococcus cultivated pure in a fluid containing urea induced in it the same change as in urine, and Musculus has since disclosed the fact that the change is induced by a chemical product, an enzyme separable by alcohol, excreted from this particular germ.

The presence of oxygen is a necessary condition of the life of the micrococcus *ureæ*, which cannot, therefore, be the cause of the ammoniacal degeneration that in bad cases of catarrhal inflammation takes place within the bladder, a sac shut in from the outside air. It was then assumed that this degeneration must be effected by other anaerobic bacteria, and, in fact, minute forms are found in freshly voided urine.

It is interesting to know that Miquel discovered in dust a very delicate bacterium which develops in the absence of oxygen. This bacillus he named the bacillus *ureæ*, because it has the power of converting urea into the carbonate of ammonia. Hence the force of Teuffel's warning, "Put no soiled catheter into the bladder."

#### THE FECUNDITY OF MICROORGANISMS

has been so often demonstrated in explanation of the suddenness of appearance of them in multitudes, and of the virulence of infectious disease, as to require mention here only for the purpose of checking the riots of the imagination. It is known that a particle from a milzbrand bacillus, so small as to be invisible under an ordinary lens, introduced beneath the skin of a guinea-pig, multiplies sufficiently to kill the animal in forty-eight hours, and a drop of the blood of the animal thus affected, properly inoculated, destroys the largest ox in a few days. It is useless to dwell upon this point of propagation. It was the recognition of it that compelled the return to the germ theory of infectious disease when it seemed to have been routed even with contumely. No purely chemical substance possesses this property. The power of reproduction or self-multiplication is limited to living things. Chemical substances admit of great subdivision, as best exemplified, perhaps, in the dissemination of odors, but such subdivision is attended always with gradual loss of substance.

Reproduction takes place in bacteria, whether by fission or spore formation, with a rapidity bordering on the marvellous. Cohn indulged himself in the pursuit of a calculation of this kind, reaching the conclusion that the progeny of a single bacterium, unchecked in growth, would in the course of three days reach the appalling weight of fifteen million pounds Troy, and in five days fill up a space of 928,000,000 cubic miles, the estimated capacity of the entire ocean. But while some such calculations may be justifiable to convey some adequate idea of the degree to which the earth and the air may be filled in a few days during the prevalence of an epidemic, it must be remembered that it was flights of fancy like these that first brought the germ theory into discredit and derision. Check is put upon the development and reproduction of all bacteria by the lack of nutrition which sooner or later must ensue,



as well as by the inimical action of different varieties upon each other. Thus the bacteria of decomposition cease to multiply, and perish in myriads so soon as the material of their food is converted into inorganic matter; the bacteria of fermentation are destroyed, or their reproduction checked by the alcohol which they form; the bacteria of cholera with desiccation, etc. The bacteria of most diseases perish with the death of their host, as well as from various other causes in life, as by the fever they evoke, or are themselves destroyed by the bacteria of putrefaction.

Thus it has been proposed to cure trachoma with the gonococci of gonorrhœa, lupus and epithelioma with the micrococci of erysipelas, and tuberculosis by the inhalation of the bacteria of putrefaction.

#### SPORE FORMATION.

The conditions affecting the process of fructification are of extreme importance to the proper understanding of the cause and prevention of acute infectious disease. A single bacterium is made up of several cells or parts, of which each cell forms one spore. Pasteur first recognized these "brilliant corpuscles," but it remained for Koch to determine their significance, and for Prazmowski and Hueppe to establish their supreme value from the point of view of differential diagnosis. The difference in the method of spore formation is also a chapter of itself which could find no discussion in the limits of this report. It is enough to say here that characteristics of specific bacteria are as definitely determined in the observation of these phenomena as in the effects of inoculation.

#### ENDOSPORES AND ARTHROSPORES.

There is now quite a general acceptance of de Bary's division of all bacteria into classes, one multiplying by endospores and one by arthrospores. Endospores are spores evolved from protoplasm in the body of bacteria in such a way that the spore forms its own membrane, while an arthrospore is a transformation of an entire part or cell of a bacterium, the membrane of the bacterium forming the membrane of the spore. True bacteria develop by endospores. Such are the pathogenic bacteria, whether in the form of micrococci, as of erysipelas, pneumonia, gonorrhœa, suppuration; bacilli, as of tuberculosis, syphilis, leprosy, diphtheria, milzbrand, glanders, and typhoid fever.

#### SPORES

are distinguished from micrococci by their bluish, opalescent cast, their high refractive power, and their obstinacy to color, because of the impermeability of their membranes. Strong acid and extreme heat, which kill the protoplasm of the bacteria, so injure the vitality of the spore membrane, as to make it permeable and admit color. Under such conditions spores may be colored intensely while the body of the bacterium is only feebly or not at all affected by color. Spores of all kinds are characterized by extreme tenacity of life. Most endogenous spores remain productive after exposure to 100° C., many even to 130° C. Anthrax spores survive a dry heat of 123° C. Endospores survive desiccation on an average about one year; those of the bacillus subtilis, according to Brefeld, three years. Pasteur claimed to have kept spores in hermetically sealed tubes, capable of reproduction after twenty-two years. Such long sustentation of life is capable, of

course, only under favoring conditions. Botanists generally admit persistence of vitality in seeds from ten to twelve years. Statements of persistence for centuries, as from mummies' tombs, are considered mythical. As a rule, as stated, spores perish in a few years, so that limit is to be put upon the assertion of an enthusiast in antisepsis that "time does not destroy septic dirt."

#### BACTERIA OF THE ALIMENTARY CANAL.

The surface of the earth may be regarded as the bottom of an ocean of air which teems with micro-organisms of every description. The origin, character, and distribution of these germs is a subject of itself. Myriads of them, among others pathogenic germs, are ingested and inhaled every day. The alimentary canal throughout its length is described as a rich garden of vegetating bacteria. Most mature forms are destroyed in the stomach under the action of the gastric juice, but many spores, and some mature forms—sarcinæ, for instance—escape to reach the intestine with all the favoring conditions of a hot-house. Mycologists speak of the flora of the feces; in fact, masses of feces are almost wholly masses of bacteria.

Bienstock, who has made a special study of these bacteria, succeeded in isolating one bacillus endowed with the specific property of decomposing albumen and fibrin. Cultivated to obtain sufficient quantity, it separates albumen and fibrin through all the successive stages of decomposition with its gases down to its final products, carbonic acid gas, water, and ammonia. No other bacteria have this property. Artificial albumen is not attacked, and casein is not touched by it. Hence it is that the stools of sucklings emit no fecal odor.

These bacteria of the intestinal canal belong to the class of

#### SAPROPHYTES.

They have to do with the resolution of organic into inorganic matter, and they are, therefore, the greatest friends of man. They have no power of penetration to the blood. It is now almost universally conceded that no germs exist in the physiological interior of the healthy body. No germs exist in healthy blood. An apparent exception proves the rule. In a number of observations with negative results, Klebs once found bacteria in the blood of an apparently healthy dog. It was subsequently learned that bacteria of decomposition had been previously introduced into this dog in an experiment on wound sepsis. The animal had long since perfectly recovered. The germs found by Klebs had still survived, and were remaining at the time of the observation quiescent. It was an observation useful also in illustration of the latent stage of disease. But even useful saprophytic germs become dangerous when they do enter the blood through breaks, sloughs, or ulcers formed by pathogenic germs. Such secondary saprophytic immigration occurs in diphtheria, typhoid fever, and smallpox as to have until recently occasioned much confusion in the recognition of the true pathogenic germs. Invasions of this kind, independently of these diseases, are probably responsible for many non-infectious septiciæmias of surgery and obstetrics, as well as for many vague "rheumatisms," "malarias," "colds," "teethings," and "gastric fevers" of internal medicine.

Pathogenic microorganisms enter the blood through

solutions of continuity in the surface of the skin and mucous membrane, including the lungs. The germs of tuberculosis, pneumonia, and all the acute exanthemata probably enter the blood by way of the lungs which permit the passage of larger and grosser matters in the dust of coal, iron, etc. Each microorganism has its own history in its preference of site,

#### MODE OF INVASION, DISSEMINATION,

and effect upon the tissues of the body. One or two of the best studied forms will serve in illustration.

The micrococci of erysipelas are deposited upon the epidermis at some break of the surface, which break may have entirely healed by the time the disease is recognized, to distribute themselves chiefly in the lymph vessels of the skin and subcutaneous fat. Hence the superficial character of the disease. They multiply, according to Fehleisen, in a direction opposite to that of the lymph currents. They are never found in the blood or in distant organs.

The bacteria of decomposition take quite a different course. One set, the staphylococci, multiply in the connective tissue without entering the lymph vessels; another set, the streptococci, enter the lymph vessels and follow their course to constitute the lymph-angiectatic processes. Suppurative phlegmonous tracts indicate their presence.

The micrococci of gonorrhœa are endowed with the property, according to Bumm, of penetrating to and multiplying in the protoplasm of the urethral cells to effect their dissolution. Hence they are distributed by the lymph vessels or are carried directly, to be found in the bladder, kidneys, Bartholini's glands, periurethral abscesses, rectum, neck and body of the uterus, sacs of the conjunctivæ, and joints of the knee.

The bacillus tuberculosis, which is at the present time perhaps the most universally distributed of all pathogenic germs, finds less ready victims than that of cholera and milzbrand, because of its immobility, its slower growth, and less poisonous products. On account of these factors, the extension of the disease in the body remains, as a rule, circumscribed. Wandering cells sometimes carry it, but its transfer to distant organs, bones, joints, testes, meninges of the brain, etc., is chiefly effected by a quite accidental irruption into blood and lymph vessels. Thus, Weigert has demonstrated at local depots the erosion of and penetration into the walls of veins, Koch a direct irruption into small arteries, and Ponfick the perforation of the thoracic duct with the sudden inundation of the whole body to constitute the clinical picture of miliary tuberculosis. Thus, also, is easily explained the sudden aggravation of tuberculosis in latent, quiescent, and convalescent cases of the disease.

Eberth and Gaffky likewise describe the penetration by typhoid bacilli of the intestinal mucous membrane with subsequent infiltration of the submucous tissue, muscular coat, mesenteric glands, and escape thence into the blood to accumulate in the spleen. Hein claims to have discovered them in the spleen during life, but Fränkel and Simmonds (*Die aetiologische Bedeutung des Typhus Bacillus*, Hamburg and Leipsic, 1866), with good reason, discredit this claim, though they were able to make pure flat cultures from the spleen post-mortem in twenty-five of twenty-nine cases.

The bacilli of typhoid fever increase in the spleen so rapidly, soon after death, as to render their detection easy.

#### THE EFFECT UPON THE TISSUES

of the body presents the same differences as the effect upon culture soils outside of the body, and here again each microorganism shows its own peculiarities. The superficial catarrhal and diphtheritic processes, parenchymatous infiltrations, coagulation necroses, neoplasms, etc., coarsely correspond to the alterations observed in the artificial culture soils.

Erysipelas, again, a surface disease, open to inspection, offers in the studies of Fehleisen perhaps the most accurately recorded observations in this regard. Fehleisen found that he could distinguish four layers or zones of inflammation. The first, the peripheric, extended about one centimetre beyond the reddened and elevated border wall. It showed no visible lesion, either in color or thickness, though its lymph vessels were stuffed with micrococci. The wall mentioned is itself the second zone, the zone of inflammatory reaction. It consists of the rapidly multiplying micrococci, with wandering cells which have partly taken up or ingested the bacteria, finally to displace and substitute them altogether. A small-celled infiltration with a total absence of bacteria marks the third zone, while the fourth shows only pallor or anæmia of the skin in process of restitution *ad integrum*. The accompanying fever and gastric catarrh—out of all proportion at times to the extent of the disease—are the results of chemical changes induced by the micrococci.

The fact that the same local phenomena are present in erysipelas migrans without constitutional signs would indicate that this disease is due to a different, though allied germ. Rosenbach found this disease often in individuals whose avocation deals with animal matter. Slight wounds of the hands in butchers, tanners, cooks, are frequently points of origin for a brownish-red infiltration which takes the precise course of erysipelas. From this infiltration he was able to cultivate a special micrococcus inoculable by puncture, and capable of producing the same condition.

True erysipelas is entirely unattended with suppuration or other destructive change than fatty degeneration of the epithelial cells and restitution by new formation. Suppurative or phlegmonous processes indicate a mixed infection with the staphylococcus or streptococcus which produces this condition. The supervention of a still graver complication—gangrenous emphysema—is due to another microorganism, this time a bacillus, of entirely different nature, the effect of which is to produce hemorrhagic infiltration of the deeper muscular structure with the development of the gases of decomposition.

A good illustration of the

#### ACTION OF MICROORGANISMS ON AN INTERNAL SURFACE

soil is offered by Löffler in the growth of the dumb-bell bacillus of diphtheria, which produces deep and extensive layers of false membrane in the fauces, pharynx, and trachea. The glutinous and pultaceous mass thus formed in a quicksand to catch and entangle the myriads of microorganisms ingested and inhaled, in such inextricable confusion as to have made it for a long time impossible to pick out the specific cause of the disease. Beneath this superficial layer Klebs and Löffler

at last succeeded in finding a special layer containing numerous cells among which, aggregated in small colonies, were special bacilli which admitted intense coloration with methylene blue. The layer beneath this again, directly superimposed upon the dilated vessels, is a fibrinous mass composing the bulk of the false membrane. It contains but few cells and no bacteria, and represents the product of reaction of the mucous membrane to the virus of the bacteria. This deepest layer is produced by the coagulation of a fibrogenous exudation which escapes from the bloodvessels and opposes a barrier to the further advance of the bacilli. Breaks in this barrier permit the absorption of the virus emanating from the bacteria or their products, to produce the constitutional symptoms of the disease.

The bacilli of tubercle, leprosy, syphilis, and glanders affect the soil of their selection in the body quite differently, in that they produce granulation tumors, or

#### NEOPLASMS

characterized by a tendency to rapid dissolution by fatty or calcareous degeneration. The cellular element of these tumors resembles that of the lymph glands. Taking tubercle as a sample, they are round cells of various size, the medium size resembling a white blood-corpuscle, with small, round, shining nuclei, provided with nucleoli. The large cells contain two, even up to twelve nuclei. Accumulation of these cells constitutes the nodule which the old anatomists named tubercles.

A tuberculous mass, on schematic section, shows an outside ring of round cells provided with a single nucleus about a narrow ring of epithelioid cells, which finally enclose one or more giant cells. The bacilli of tuberculosis are found in all parts of the tuberculous mass, free—that is, between the cells—as well as in the interior of the cells.

But the most characteristic as well as curious phenomenon is presented in the behavior of the

#### BACILLUS IN GIANT CELLS,

a question which brings the subject to its most intimate ultimate relations.

The giant cell, as is well known, is distinguished by the number of its nuclei, as well as by its size. When but a single bacillus penetrates to the interior of a giant cell, the nuclei of which are disposed about the circumference of the cell, it is commonly found in the free

FIG. 1.



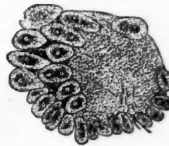
The bacillus in the giant cell.

space at or near the middle of the cell. But it is more common to find all the nuclei grouped together at one end, with the bacillus at the opposite, often at the extreme opposite, end of the cell. The poles of the cell are thus occupied, one by the nuclei, the other by the bacillus. Thus they stand facing each other like foes,

and it is impossible to resist the conclusion that there exists between them an antagonism which keeps them as far as possible apart.

When two bacilli are present, it is not unusual to find one at each end or pole of the cell, while the nuclei are all grouped about the centre or equator, or, the relations being changed, the bacilli are disposed at the equator while the nuclei are grouped at the poles. It looks, Mittenzweig says, as if each group of nuclei was holding a bacillus in check. When the number of bacilli is greater, they do not long remain in this passive state.

FIG. 2.



For they are soon to be seen at different places in the cell, close to and between the nuclei, with their long axes perpendicular to the surface of the cell. The wall of the nucleus is thus broken down and the giant cell succumbs. Groups of bacilli are thus found arranged in a stellate form, but no longer surrounded with nuclei.

Koch concludes, hence, that the penetration of an epithelioid cell by one or more bacilli is the first step or stage in the origin of a tubercle. The virus or poison emanating from the bacillus irritates the cell to such a degree as to lead to increase in its size and multiplication of its nuclei—in other words, directly to produce the giant cell. The irritation extends to neighboring cells, to induce hyperplasia, and to vessels, to lead to emigration of the white blood-corpuscles. Meantime, the struggle continues in the giant cell, to end occasionally in the destruction of the bacillus, but far more frequently in the triumph of the germ. They then break through the circle of nuclei, escape from the wall of the cell to attack new cells, with similar fate. The ruptured cell suffers necrosis, the plasma current ceases, plasma and nuclei coagulate, nuclei are broken up into debris, and the whole cell is converted into a homogeneous, inert, dead mass. The condition may be arrested at this stage, as in the spleen, or may, as is usual elsewhere, suffer a later conversion into caseous matter. Bacilli which have not escaped to other cells perish with the death of the cells, their hosts. Syphilitic neoplasms show the same phenomena, except that they are more prone to undergo fatty degeneration, resorption, and cicatrization (Mittenzweig). The conduct of

#### BACTERIA IN THE BLOOD

current itself, or their effect or action upon the elements of the blood, is but little known. In most cases the stay is too short for any permanent effect. But one curious observation has been made by Metschnikoff concerning the bacilli of milzbrand and the white blood-corpuscles, which throws light upon the question of susceptibility and immunity of disease. With suspicion based upon the familiar fact of the absorption of food and foreign bodies into the interior of amoeboid bodies, by protoplasmic protrusions and inclusions, and more especially upon the observation of a disease in small crustacea caused by the entrance of a peculiar fungus into the colorless



blood-corpuscles of the animal, Metschnikoff concluded to study the relations of the milzbrand bacillus to the white blood-corpuscles of vertebrate animals. He soon discovered that the blood-corpuscles of susceptible animals (rodents) only exceptionally incorporated virulent bacilli, whereas the blood-corpuscles of insusceptible animals (frogs, lizards) took them up abundantly. Being thus ingested or included, they soon perish in the interior of the cell, and finally disappear entirely. The same fate awaits milzbrand bacilli in the bodies of susceptible animals, when their virulence has been attenuated or abstracted in any way, as by artificial heat.



Leucocytes as phagocytes.

These observations, should they meet with wider confirmation, must throw light upon the obscure subject of

#### IMMUNITY

conferred by an attack of disease against its repetition as well as upon protective vaccination. For we lack as yet a sufficient or satisfactory explanation of the immunity thus conferred, though three plausible hypotheses have been proposed. The first is the theory of exhaustion, which assumes that the germs of the disease exhaust the elements in the blood necessary to their nutrition. Something analogous to this is seen in vegetation of higher structure, which cannot be made to grow indefinitely in the same soil. The second is the antidote theory, or the theory of antagonism, which supposes that certain products evolved from the soil in the multiplication or growth of germs react upon them fatally. The analogy here is found in the process of fermentation, whereby the torulæ cease to produce themselves, become quiescent and sink to the bottom of the vessel as soon as the proportion of alcohol reaches twenty per cent. There is reason to think that the fever evoked by microorganisms is in some cases fatal to their growth and life. The third is the theory of accommodation, which maintains that the tissues in their first struggle with the microorganisms acquire a higher degree of energy or vitality, whereby they are enabled to endure or resist future attacks. Perhaps a simile may be found for this hypothesis in the process known as acclimatization. The observations regarding the

#### INCORPORATION AND ABSORPTION

of non-virulent or less virulent germs tend to support the theory of accommodation. For it would follow from them that protective vaccination, or, more properly, inoculation of weak bacteria, must confer upon the blood corpuscles the power to incorporate and destroy virulent bacteria. When protection is not sufficiently secured at once by a certain grade of attenuation, it might be accomplished by successive attempts with gradually increasing potencies. Thus successive inoculations of gradually increasing virulence would finally permit the

introduction into the body of the most intensely virulent bacteria with impunity. It is upon this theory that Pasteur bases his claim to secure prophylaxis in hydrophobia, a disease in which sufficient time elapses, as a rule, between the wound and the symptoms to make experiments even after the wound, in the hope of anticipating the attack of the disease.

The fact that virulent bacteria are not absorbed would indicate, in the absence of any morphological difference, the presence in these bacteria of some chemical substance which antagonizes the cell. Moreover, the character of the constitutional symptoms—sopor, stupor, coma, delirium—which supervene in cases of grave, acute infections speak in favor of this view, and against the belief that bacteria act mechanically or by the abstraction of oxygen. In fact, neither the local nor the general signs of infectious disease are ever produced or can be produced in this way. The question now arises,

#### HOW DO PATHOGENIC MICROORGANISMS PRODUCE THE PHENOMENA OF DISEASE?

From the rapidity of their multiplication, it might be inferred that the symptoms and lesions of the infectious maladies are caused by the mere presence of these organisms as foreign bodies. But it has been observed that the bacilli of milzbrand alone multiply in the body in such number as to produce extensive occlusions of vessels. Further, it has been shown that no mere mechanical presence, no mere foreign bodies, aniline particles, or granules of cinnabar, ever induce the signs of fever or toxicæmia. The microorganisms of disease live in the body, and must, therefore, be nourished at its expense, whereby they withdraw from the blood or tissues elements essential for their nutrition. Pathogenic microorganisms require oxygen. In processes of fermentation outside air is excluded, in order that the germs of fermentation may be compelled to withdraw oxygen from the culture soil. Pathogenic microorganisms, multiplying in great abundance, seize upon the oxygen of the blood with such avidity as to develop, in fulminant forms, symptoms simulating those of prussic acid poisoning. But the other symptoms mentioned do not correspond either to deficient oxygenation or to carbonic acid poisoning.

These symptoms indicate toxicæmia, and since the injections of fluids from which bacteria have been separated by unglazed porcelain filters remain innocuous, it follows that the toxic agent inheres with the bacteria. Then, inasmuch as blood corpuscles show their reaction against bacteria on simple contact, it follows that the poison must lie upon or issue from their surface.

The only poisons, hitherto known, which may in such minute quantities induce such grave toxic signs are the poisons resulting from the action of the bacteria of decomposition upon organic matter. As these intensely virulent poisons were first observed only in dead organic matter, they were called

#### PTOMAINES

(from πτῶμα, the fallen, a corpse, hence more grammatically ptomatins). These matters, the ptomaines, though but recently discovered, have received so much attention in the past year as to form a subject in themselves. It may be said here that some cadavers develop

no ptomaines, that ptomaines are developed as putrefaction advances in the course of weeks; next, that they are also found sometimes in animal products, as in cheese, urine, feces, etc.; and lastly, that many ptomaines are perfectly innocent. Then, it might be added, that many phenomena attributed to their action have been found due to simpler causes. Thus the claims of Passet, that any one of the eight forms of bacteria which he cultivated from pus, would coagulate sterilized milk, were found to rest upon simple lactic acid fermentation.

Brieger, who has made the most exact observations, operated with the Koch-Eberth bacillus of typhoid fever, which he cultivated from the spleens of fatal cases, and found to be identical with the pure cultures in the laboratory of Koch. These bacilli thrive in solutions of sterilized grape sugar, to which have been added the proper nutritive salts. This clear fluid, kept in sealed tubes at a temperature of 30° C., becomes opaque in twenty-four hours after introducing the bacilli, and emits on opening the tubes a distinct odor of ethyl-alcohol, which increases from day to day. Besides the ethyl-alcohol, there develop small quantities of volatile fatty acids, together with acetic acid in large quantity. The typhoid bacillus has also the property of inducing in solutions of grape sugar the lactic acid fermentation. Sterilized bouillon, or minced meat used as soils, soon becomes alkaline, but develops, even after the lapse of eight weeks, none of the products or gases of decomposition. From these, as from all albuminous cultures, Brieger was frequently, but not always, able to obtain a basic product, which gave the chemical and physiological reactions of a ptomaine. In guinea-pigs it produced a slight ptialism and an increased rapidity of respiration, followed, later, by a loss of power in the muscles of the extremities and trunk, without a distinct paralysis. There is diarrhoea throughout, and death takes place in twenty-four or forty-eight hours.

The same observer is now experimenting with the septic diseases of which the abnormal temperature elevations, interruption of functions, benumbing of the intellect, perverse action of the digestive apparatus indicate abnormal chemical changes in high degree.

Nicati and Rietsch, Villiers, Pouchet, have all made similar investigations with the bacteria of cholera. According to Pouchet, chloroform extracts of cholera dejections furnish an easily oxidizable and intensely poisonous oily substance which is certainly a ptomaine. Mere traces of it introduced into the bodies of frogs induce retardation of the pulse, with speedy death, attended by muscular rigidity.

Villiers also succeeded by the method of Stas in isolating a ptomaine from the intestines, kidneys, liver, and blood, in two cases which had succumbed to cholera. It was abundant in the intestines, but very scant in the blood. It had a sharp taste and an odor like the flowers of the white thorn. It had no effect upon frogs, but caused in guinea-pigs retardation of the pulse, tremor, and death.

According to the same author, cultures of the cholera bacteria have a peculiar ethereal odor which is not unpleasant. Solutions of this culture not over eight days old in bouillon or gelatine filtered free of bacteria, injected into the blood of dogs, induce diarrhoea and great depression, with dyspnoea, disturbances of motion, and sometimes death.

These experiments are cited merely as samples to show the direction of research at the hands of the most advanced observers in the past year. They indicate the lines of study by means of which we shall be able to combat the cause of infectious disease in a direct way. They show us that the time is at hand when, as Brieger observes, we may, as practitioners of medicine, no longer be compelled to rely upon empiricism, when we may find a specific therapy, if not remedy for a specific cause, since we have already learned that the accumulation of certain products of bacteria kills them. They show us that inflammation is not the cause, but the effect of disease which is caused by infection. They show us the direct road to cure through comprehension of the nature of infection.

### THE ADDRESS IN SURGERY.

#### THE PRESENT STATUS OF ABDOMINAL SURGERY.

*Delivered May 5, 1886.*

BY N. SENN, M.D.,  
OF MILWAUKEE, WIS.

(Continued from page 511.)

#### RUPTURE OF DIAPHRAGM.

RUPTURE of the diaphragm with escape of abdominal organs into the cavity of the chest is a rare accident, but when it does occur it is so uniformly fatal when treated on the expectant plan, that, in these days of heroic surgery, it would appear only reasonable to make an effort to save life by abdominal section, or by an opening into the chest. Either procedure would enable the surgeon to replace the dislocated organs and to close the rupture by suturing. A number of traumatic ruptures of the diaphragm with protrusion of abdominal organs into the cavity of the chest have been reported, in which during life, at least, a probable diagnosis could be made. All of the cases reported by Butlin and Brinton occurred on the left side. The physical signs on which the diagnosis was based consisted of tympanitic resonance over the side of the chest which contained the prolapsed intestines, with diminution of vocal fremitus and respiratory sounds over an area corresponding to the displacement of the lung. In pneumothorax respiration is abdominal, in traumatic diaphragmatic hernia the respiratory movements are costal, and the abdomen is flattened; conditions which are suggestive of the escape of gas-containing intestine into the cavity of the chest. Symptoms of intestinal obstruction indicate strangulation of the protruded bowel. Guttman regards displacement of the heart, in the absence of other causes, the most reliable diagnostic symptom.

An interesting case of traumatic diaphragmatic hernia which came into Albert's clinic has been described by von Horoch. The patient received a stab wound immediately under the left scapula. He died two days later with symptoms of asphyxia. The post-mortem examination showed that the left lung and the diaphragm were punctured by the knife. Through the wound in the diaphragm a portion of the stomach which had also been opened, had escaped into the left pleural cavity. The reporter found three similar cases

in literature. He suggested that in a diaphragmatic hernia, recent or old, presenting symptoms of strangulation, the chest should be opened sufficiently by rib section to permit reduction, and to close the wound in the diaphragm in such a manner that the sutures should embrace the serous coat of the stomach.

That the recognition of a diaphragmatic hernia is not always an easy task even after opening the abdominal cavity is illustrated by Ferrari's case. This surgeon performed laparotomy on a young woman who had suffered from symptoms of intestinal obstruction for seven days. The small intestines having been turned out from the abdominal cavity, a careful examination of their whole length, and of the cæcum, sigmoid flexure, and rectum was made without the discovery of any cause for the obstruction. The wound was closed and the patient rallied well and showed signs of improvement until next morning when sudden collapse manifested itself with speedy death. Post-mortem examination showed the existence of a diaphragmatic hernia from laceration—almost the entire transverse colon had escaped into the left pleural cavity, the distended loop of the intestine displacing the heart and the left lung. In the space near the diaphragmatic ring it was noticed that the constriction of the bowel was such as hardly to admit the tip of the finger. Upon trying to reduce the hernia, the ascending gut slipped back into the abdominal cavity without offering any resistance.

The establishment of a route to the diaphragm through the chest is not practicable on account of the frequency with which pleuritic adhesions are found and the greater amount of additional traumatism as compared with abdominal section, hence the latter should be preferred for the relief of diaphragmatic hernia in all cases in which a probable diagnosis can be made and in which symptoms of strangulation dictate the propriety and justifiability of the operation. If the injury is produced by a penetrating wound of the chest, the method of operation suggested by von Horoch would be applicable and in case the symptoms pointed to visceral injury of the abdominal organs it should be combined with abdominal section.

#### THE TREATMENT OF PERITONITIS BY ABDOMINAL SECTION AND DRAINAGE.

The great fatality of acute diffuse peritonitis under the old or expectant method of treatment gives some support to the recently proposed treatment by incision and drainage. This now common and general surgical procedure has been already applied with great success for the relief of inflammatory lesions of all of the other serous cavities. The first record of an operation performed deliberately on account of acute peritonitis was proposed and executed by Dr. Wiltshire, in 1868. About thirteen years ago Mr. Lawson Tait followed Wiltshire's example. Since that time he affirms he has never allowed a patient to die of peritonitis without opening the abdomen, whenever he was permitted to perform the operation. He has performed abdominal section forty-four times on account of the presence of peritonitis, and the operation has been completely successful in forty-one cases.

As peritonitis is usually only a secondary manifestation of an antecedent primary cause, it appears plain that the treatment by surgical interference will be most suc-

cessful in cases in which the disease has not become diffuse, and in which the original cause can be removed. Cases of this kind are represented by

1. *Perforative peritonitis.* In order to recognize this condition early when most amenable to surgical treatment, it is important to allude to some of the most prominent early symptoms. Observation of a number of cases of peritonitis following perforation has satisfied Ebstein that the abdominal walls usually remain tense and rigid without distention; the abdomen may be flat, and even depressed. The contracted condition of the abdominal muscles remains for a variable length of time, when it is followed by distention with or without rigidity. The contraction of the muscles diminishes as the paralytic symptoms increase. Ebstein asserts that the absence of the normal liver dulness cannot be depended upon as a pathognomonic symptom of perforative peritonitis. He alludes to a case of perforation of the stomach where no gas had escaped into the peritoneal cavity to produce displacement of the liver. The liver also remains in its normal position in cases in which fluid escapes into the peritoneal cavity, and in which the organ has formed adhesions by previous attacks of perihepatitis. The absence of vomiting in a case of peritonitis, or its sudden cessation in the beginning of an acute attack indicates, when the patient is conscious, that either perforation of the stomach has caused the peritonitis or that perforation of the stomach has followed peritonitis. Vomiting is not present when perforation has taken place into the peritoneal cavity, or the bursa omentalis. A case, reported by Ebstein, appears to prove that vomiting again may take place in cases of perforation of the stomach as soon as the opening in the stomach has become closed by adhesions to neighboring organs. Perforation of the appendix vermiformis, bursting of a pyosalpinx or pelvic abscess, furnish familiar illustrations of perforative peritonitis in which a timely laparotomy would hold out encouraging prospects for a favorable recovery.

Mr. Treves has also shown that nearly all abscesses about the cæcum are, in reality, intraperitoneal, so that in opening these abscesses the surgeon always has to deal with the peritoneal cavity. As these abscesses are generally circumscribed by adhesions, a failure to open them in time may result again in perforation and secondary diffuse peritonitis.

Mr. Howard Marsh relates a successful case of abdominal section for suppurative peritonitis produced by the bursting of an abscess in the mesentery around old tubercular glands into the peritoneal cavity. The patient was a young man, nineteen years of age, who had suffered some time with symptoms of diffuse peritonitis. The abdomen was found exceedingly tender and distended. The incision was made over the most prominent portion of the swelling on the outside of the linea semilunaris, and gave exit to two or three points of fetid pus. The distended coils of small intestine could be felt through the wound. The cavity was washed out with a weak solution of carbolic acid and drained. The patient made a slow but good recovery.

J. W. Taylor reports an interesting case of acute hydronephrosis, in which rupture of the cyst into the peritoneal cavity produced great collapse, and in which a timely laparotomy prevented a fatal peritonitis. The patient was a girl, fifteen years of age, who was attacked



suddenly with pain in the left lumbar region, and vomiting, followed by the appearance of a fluctuating tumor in the same side, which was at the time diagnosed as acute hydrops of the left kidney. She suddenly became collapsed, which, with other grave symptoms, indicated rupture of the cyst and extravasation of its contents into the peritoneal cavity. The abdomen was opened at once through the median line. The abdominal cavity was thoroughly cleansed, and the remaining portions of the cyst contents were removed by puncturing with the trocar. The cyst wall was sewed to the abdominal wound, and against all expectations the patient rallied and improved. In a few days the cyst refilled, which necessitated a second incision and drainage by means of a glass drain. Urine was discharged through the wound, but the patient improved. As no calculus could be found by an exploration of the interior of the cyst, it was believed that the left ureter had become completely obliterated, which would necessitate a nephrectomy at some future time.

That even perforation of a large pelvic abscess into the peritoneal cavity may terminate in recovery by timely and well-applied surgical treatment is well illustrated by a case reported by Mr. Treves, in a paper read before the Royal Medico-Chirurgical Society, March 10, 1885. The patient was a female, twenty-one years of age, who had suffered for three months from chronic pelvic peritonitis following severe gonorrhœa. During this time a large purulent collection containing very offensive matter had formed near the pelvic brim. The acute symptoms were due to the bursting of the abscess and extravasation of its contents into the general peritoneal cavity. On the following day the abdomen was opened under antiseptic precautions, the patient at the time being in a very critical condition. The peritoneum and intestine showed signs of diffuse recent inflammation. The peritoneal cavity contained a quantity of semi-opaque fluid, mixed with flakes of lymph and pus. The whole peritoneal cavity was washed out with many quarts of water, and a drain introduced. The symptoms improved promptly, and the patient recovered.

These cases furnish abundant proof that in cases of perforative peritonitis, irrespective of the nature of the material which has been extravasated, our only resource which affords any encouragement whatever is abdominal section. In cases of this kind it is important to search for the cause of the peritonitis, and to treat the conditions, if necessary, by operative measures; the toilet of the peritoneal cavity can be most effectively accomplished by copiously flushing with warm, sterilized water rendered slightly alkaline by the addition of chloride of sodium. As in these cases we can never be certain that the peritoneal cavity has been rendered perfectly aseptic, it is advisable to resort to drainage. We have every reason to hope that in the future perforation of the stomach or intestines will be treated by abdominal section, as it holds out the only possibility of preventing death from the consecutive peritonitis, by removing the extravasation and preventing further escape by closing the rupture. In such instances it is essential to search for the perforation, which must be treated in the same manner as intestinal wounds, after which the peritoneal cavity is cleansed, drained, and the wound closed.

The successful local treatment of tuberculosis has recently been extended to:

2. *Tubercular peritonitis.* König has called attention to the difficulty met with in the diagnosis of circumscribed ascites following tuberculosis of the peritoneum, and other fluctuating tumors of the abdominal cavity. He refers particularly to the peculiar kind of fluctuation found in these cases as an almost pathognomonic evidence. The fluctuating waves are large and are conveyed from one wall to the other, and the undulations are imparted to the abdominal wall.

Von Holst reports a case of tuberculosis of the peritoneum which was remarkable from the fact that, on percussion and palpation over the abdomen, dullness and fluctuation were felt as distinctly as in ascites, which on post mortem was not found to exist. The deception was due to firm adhesions which had formed between the omentum and intestines.

Not infrequently one or more smaller swellings are felt in the vicinity of the large one. Clinically it has been shown that the swelling may decrease in size for a time, or that it may remain stationary for a considerable length of time. Tuberculosis of the peritoneum is most frequently found as a complication of tuberculosis of other organs, but sometimes it occurs as a primary lesion in persons without any hereditary taint. Bucquoy observed a case which had its origin in a cheesy tubercular degeneration of the ovaries. König reports four cases of abdominal section performed for tuberculosis of the peritoneum. The patients were all females. One of them remained well two years after the operation. The exudation was usually found immediately beneath the anterior abdominal wall, the intestines, uterus, and ovaries being pushed backward. The cyst was always found lined with a thick fibrinous wall which presented all the microscopical appearances characteristic of tuberculosis. After incision the fluid was evacuated, the sac washed out with carbolic water, and the inner surface of the cyst dusted with iodoform. In the case which remained well after two years the cavity was drained, and the patient left the hospital with the drainage tube. The fistulous opening healed subsequently. König is of the opinion that in some cases of primary tuberculosis of the peritoneum a radical cure can be effected by laparotomy and local treatment.

3. *Chronic peritonitis with effusion.* The most favorable pathological condition of the peritoneum for surgical treatment is chronic inflammation with serous effusion. Abdominal section with drainage relieves the pressure promptly and thus favors reabsorption and the restoration of the physiological balance between secretion and absorption. Savage reports that he has performed laparotomy in six cases of subacute peritonitis attended by more or less effusion, and all of his patients recovered.

4. *Ascites.* Dr. A. G. Caillé, of New York, has recently called the attention of the Academy of Medicine to the value of permanent drainage in ascites (*THE MEDICAL NEWS*, February 13, 1886). He related two cases of cirrhosis of the liver with marked ascites, in which he had inserted a drainage tube into the peritoneal cavity at the linea alba, with the result of affording great relief of all the distressing and dangerous symptoms, and probably prolonging life for a considerable period. In one case an autopsy could not be secured,

but in the other one was made, when it was found that there was not the slightest indication of peritonitis at the point where the fistula was made. If permanent drainage of the peritoneal cavity is possible without causing inflammation, it is obvious that the treatment of ascites by drastic cathartics, diuretics, and other debilitating measures should be abandoned.

#### GASTROSTOMY.

The indications for gastrostomy have multiplied with the advances of modern aggressive surgery. The following are conditions for which the operation has been performed: 1. Extraction of foreign bodies; 2. Malignant disease of œsophagus; 3. Non-malignant stricture of œsophagus; 4. Cicatricial stenosis of pylorus. Ashurst has collected 107 cases in which the operation was done with a view to establish a permanent gastric fistula for the following conditions: carcinoma, 72; syphilitic stricture, 2; cicatricial stenosis, 16. Of this number 24 patients survived the operation for more than 30 days; of 22 cases proving fatal soon after the operation, 12 died of diffuse peritonitis, and 3 of phlegmonous inflammation of the abdominal walls.

1. *Gastric fistula.* When the operation has for its object the formation of a gastric fistula, it is of some importance to know at what point the stomach can be opened most advantageously by interfering least with its functional capacity. The majority of operators have had recourse to Fenger's incision about two inches below and parallel to the left costal arch. Sédillot recommends an incision which should correspond to a point over the middle of the anterior surface of the stomach, claiming that the subsequent traction upon the cicatricial band in this locality would be reduced to a minimum, at the same time there would be no risk of injury to any important bloodvessels. Larger argues in favor of making the fistula as near the cardiac end of the stomach as possible, and nearer the lesser than the greater curvature of the organ. Berger and Championnière assert that clinical experience and post-mortem examinations have shown that the opening is usually made near the pyloric orifice of the stomach, irrespective of the particular method of operation selected by the surgeon. They also believe that a fistula in this locality does not impair the functional result. When a gastric fistula is to be established, the operation should be done in two sittings. The preliminary operation consists in making abdominal section, stitching the parietal peritoneum to the skin, thus protecting the soft tissues against phlegmonous inflammation by contact with infectious substances, and fastening the anterior surface of the stomach with Lembert's sutures to the margin of the wound, so as to secure adhesions between the visceral and parietal peritoneum before the organ is opened. After two or three days firm adhesions have formed, when the operation is completed by making a small incision through the wall of the stomach. Experience has shown that when the incision is large, it is difficult to prevent the escape of the contents of the stomach through the fistula even by ingenious contrivances, while a small opening is readily kept closed by a well-fitting compress.

2. *Extraction of foreign bodies.* When a foreign body has become lodged in the stomach, and its presence can be ascertained by a well-defined complexus of

symptoms or by physical examination, no time should be lost in removing it by gastrostomy, as the foreign body may produce death by interfering with gastric digestion or by producing perforation. Under these circumstances the operation is completed by suturing the wound in the stomach after extraction of the foreign body in the same manner as an intestinal wound, using the precaution to apply a double row of sutures to secure more efficient and perfect coaptation of the margin of the wound and serous surfaces. Absolute and complete physiological rest of the organ is an essential condition for obtaining primary union in the shortest space of time. Gussenbauer removed by gastrostomy a sword blade 27 cm. in length and 2 cm. in breadth. The patient unfortunately died of septic peritonitis due to a perforation of the posterior wall of the œsophagus 14 cm. above the cardiac orifice of the stomach, and another perforation in the fundus of the stomach 1 cm. in width. Billroth removed successfully a set of false teeth in the same manner, and the patient recovered without any untoward symptoms.

That the stomach may become the receptacle of strange and most disgusting substances, is well illustrated by the cases recently reported by Schoenborn and Thornton, where gastrostomy was successfully performed for the removal of large masses of hair. Both patients were hysterical females. In Schoenborn's case the mass of hair weighed 281 grammes. That these cases are not so exceedingly rare, is shown by Thornton, who has collected 8 recorded cases where post-mortem examination revealed that the presence of hair in the stomach produced death, without a correct diagnosis having been made or surgical relief attempted.

3. *Malignant disease of œsophagus.* The results obtained by gastrostomy for the purpose of prolonging life in cases of carcinomatous stenosis of the œsophagus are not such as to entitle the operation to the dignity of a justifiable procedure, and yet it must be a source of comfort to the surgeons who continue to perform it to know that the mortality which attends it has greatly decreased since the antiseptic treatment of wounds has been introduced. Zesas, for instance, has collected all cases of gastrostomy before and since the antiseptic treatment of wounds was practised. During the pre-antiseptic period 31 operations were performed, with the result that only in one case was life prolonged by the operation (Jones). Of 131 cases operated upon under antiseptic precautions, 28 terminated favorably so far as the operation was concerned. In 104 cases carcinoma of the œsophagus furnished the indication for the operation, of which only 17 recovered from the immediate effects of the operation. With such mortality it becomes a serious question whether the operation is ever justified under the circumstances. Zesas, as the result of his investigations, advises that the operation should be performed early, before the patient has been prostrated from the effects of the disease. It behooves the conscientious surgeon to ask himself the question: Am I justified in submitting a patient suffering from an incurable affection to an operation of such gravity, which at best can prolong life only for a short time? Science, statistics, and humanity answer with a most positive and unqualified No!

4. *Non-malignant strictures of œsophagus.* In non-malignant strictures of the œsophagus not amenable to

more conservative treatment, gastrostomy should be performed with a view of securing a new inlet for food into the stomach, and for the purpose of affording a more direct route for treating the stricture. So far, the operation has been performed by Caponotto, Schede, Cérenville, McNamara, Davies-Colley, and Bryant. Fagan's two cases died. In Schede's and Cérenville's cases the principal and direct object of the operation—dilatation of the stricture—was not realized. The same applies to McNamara's case. Davies-Colley's and Bryant's cases were successful in every respect, as the dilatation of the stricture was accomplished and the permeability of the œsophagus was restored, so as to warrant the closure of the fistula.

Caponotto's case deserves special mention, as it illustrates in an admirable manner the indications for the operation, the method of performing it, and its results. The operation was performed at Turin, September 19, 1884. The patient was a boy five years of age, who had swallowed by mistake sulphuric acid five months before the operation. Soon after the accident symptoms of stricture appeared. He ate and drank with a good appetite, but vomited everything a few minutes after, and in consequence had become greatly emaciated. The finest olive-pointed bougie could not be passed through the stricture. The abdomen was opened at the usual place for a gastrostomy and the parietal peritoneum was united with the skin, and a continued catgut suture, that caught only the serous and muscular coats of the stomach, was made to fix the stomach to the wound. An antiseptic dressing was applied. On the fifth day the stomach was opened and food introduced directly into the stomach. The patient improved rapidly. The next step was to dilate the stricture, which was done by combined dilatation by means of sounds introduced both through the stomach and œsophagus. After one month's treatment the œsophagus was permeable to food, and the opening in the stomach was closed by a second operation. Four months subsequently the boy died of tubercular meningitis. The autopsy showed that the stomach was slightly adherent to the abdominal wall at the site of operation. The stricture had its location about two cm. above the cardiac orifice, as was shown by a white, circular cicatrix.

Loreta's method of digital dilatation in non-malignant pyloric strictures is deserving of confidence, and the results so far obtained merit imitation of the procedure.

5, *Cicatricial stenosis of the pylorus.* In the operative treatment of cicatricial stenosis of the pylorus, the surgeon can resort to gastrostomy with subsequent gradual or forcible dilatation of the stricture, pylorotomy, or gastroenterostomy. According to Zesas, gastrostomy for pyloric stenosis has been performed 27 times with 11 recoveries. In these cases the object of the operation is limited to the direct treatment of the stricture through the gastric wound, or fistula. If after opening the stomach the stricture can be efficiently overcome by rapid digital dilatation, the visceral and abdominal wounds can be closed. If, however, the object is not attained, a permanent gastric fistula must be established for subsequent gradual dilatation until the permeability of the organ has been restored, when the fistula is closed by another operation. It is only proper to remark that the operative treatment of cicatricial pyloric

stenosis should be limited to extreme cases of narrow strictures with great dilatation of the stomach, in which simpler measures have proved ineffective in affording relief and maintaining nutrition.

(To be continued.)

## MEDICAL PROGRESS.

PROFESSOR GAUTIER ON NEW LEUCOMAINES.—The interesting researches carried out during some years by the distinguished chemist of the Collège de France resulted in the discovery of a group of bodies resembling vegetable alkaloids, or rather the alkaloids which had been found by himself and others, to which the term ptomaines, or cadaveric alkaloids, is now applied. But the importance of his discovery lies in the fact that these bodies, to which he gave the name leucomaines, are found in healthy living matter, and there is every reason to believe were produced by the chemical changes of assimilation and disassimilation. Whether this is the exact truth, can only be proved by the results of future observers; but the physiologist is often rather shy of accepting the results of the chemist, armed as the latter is with powerful agents of chemical destruction, and it is often urged that he has himself produced the bodies he has found. Putting this question on one side, the importance of the new views to the subject of medicine can easily be seen. The living being is constantly manufacturing in his own tissues agents which can produce disease or death. We have not the same necessity to search for the ever-present etiological factors of cold and damp, or too hastily summon the microbes to explain our diseases. This discovery was, as might be expected, seized with delight by the antimicrobists; they had scientific evidence on which to found their opinions, and it must be said that they have in no way neglected to push the theory to its logical consequences. Ever since Professor Gautier's first paper at the Academy of Medicine, about two months ago, the subject for discussion has been the same—the leucomaines *vs.* the microbes; and lately a fresh support has been given to the antimicrobists by the announcement from the Professor of two new leucomaines, the poisonous properties of which are undoubted. The first body is called "adenine." It was discovered by M. Kossel, of Berlin, in the pancreas and spleen, and was described in Hoppe-Seyler's *Zeitschrift* of March 11. It appears to exist in all animal and vegetable cells, and can be extracted from them by neutral reagents; and, further, it appears that it is derived in the cell from the nuclein—a body already known—since under the influence of water and heat the nuclein produces adenine, phosphoric acid, and albumen. Adenine itself can be wholly transformed into hypoxanthine or sarcine—thus showing its near relation to the bodies we vaguely call nitrogenous metabolites; but a more interesting relation is hydrocyanic acid. The formula of prussic acid is HCN; the formula of adenine is  $H_5C_4N_6$ , and cyanide of potassium can be produced from it. The second body was isolated by M. Morelle from the spleen. This organ was chosen by the advice of Prof. Gautier because of its undoubted purifying action on the blood, being the place where alkaloidal and similar noxious products of metabolism are retained. The physiological properties of this leucomaine were tested,



and it was found to be a paralyso-motor, with a powerful action on the medulla oblongata. A small quantity injected under the skin of a guinea-pig appeared at first to produce nothing abnormal, with the exception of immobility, a refusal of food, and some swelling near the point of injection for the first forty hours, but by degrees the depression and suffocation increased, and the animal died asphyxiated. At the necropsy were found congestion of the lungs with subpleural ecchymoses, general oedematous infiltration of the liver, spleen, and kidneys, and a certain hardness of the ventricles, appearing to indicate the arrest of the heart in systole.—*The Lancet*, April 24, 1886.

**OLEOMARGARINE.**—The following statements are taken from the Supplement to the Fourth Annual Report of the State Board of Health of Massachusetts:

The use of substitutes for butter seems to be steadily on the increase in this country. When good butter is at from forty to fifty cents per pound, it has passed beyond the means of persons in moderate circumstances, and they have the choice of three things: to do without, to use poor butter, or to use some substitute.

It was, according to Mège-Mouriez, a demand such as this which led him to investigate the manufacture of a palatable substitute for butter from the fat of animals slaughtered for food. By his investigations he was led to believe that the only difference between butter and beef-fat was that the latter contained an excess of stearine. He also came to the conclusion that the taste and smell of ordinary tallow are largely due to the want of care in its manipulation. He therefore prescribed the following method of procedure:

The caul fat was to be taken as fresh as possible, and to be thoroughly washed, then chopped fine and rendered with a dilute solution of acid phosphate of lime and the stomach of a pig or sheep at a temperature not exceeding animal heat. (This heat has been gradually raised in reissues of his patent until, at the present time, it reads, "at a heat not exceeding 125° F.") It is not possible to do good work at a temperature below 116° F.) After the fat is completely liberated by this process, it is allowed to stand until the membrane settles; it is then drawn off into coolers, and allowed to granulate and to cool to a temperature of about 80° F. The fat is then placed in cotton-cloth press-bags, and submitted to a powerful press, the press-room being maintained at an even temperature of 80° F. The oleomargarine thus produced is free from any disagreeable taste or odor. It is in fact a pure tallow oil, suitable for use as an article of food; in this state it makes an excellent substitute for lard.

Such was the process as originally proposed by M. Mège. The process as now followed is much more simple, and omits some of the objectionable features of the Mège process.

In the first place, the fat, which is received warm from the slaughter-house, is sorted over, and all bloody pieces thrown out; it is then at once placed in cold fresh water, where it is thoroughly washed. From this water, which not only washes it but serves to cool it, it is at once taken to hashing-machines, similar to the ordinary sausage-cutters, where it is cut into fine pieces. From these machines it falls at once into the rendering tanks, where it is rendered at a heat varying from 160° to 200° F.; the object being to separate, as quickly as

possible, the fat from the membrane. No "gastric juice" or phosphate of lime is used. After the fat is well cooked a quantity of salt is added; this serves to separate the membrane more completely. After standing a few minutes the fat is then run off into barrels or other vessels, where it is allowed to settle, and is crystallized. When it has cooled to about 95° to 100° F., it is pressed in the usual manner.

After pressing, the oil is churned with milk or butter-milk, some genuine butter being frequently added; it is colored properly, and then run into ice-water or pounded ice, so as to prevent its crystallization; after this operation it is worked as ordinary butter.

When well made it is a very fair imitation of genuine butter, being inferior to the best butter, but much superior to the low grades of butter too commonly found in the market.

So far as its influence on health is concerned, we can see no objection to its use.

Its sale as genuine butter is a commercial fraud, and as such very properly condemned by the law.

As to its prohibition by law, the same law which prohibited it should also prohibit the sale of lard and tallow, and, more especially, all low-grade butters, which are far more injurious to health than a good, sweet article of oleomargarine.

A great deal has been said in regard to the poor grade of fats from which the oleomargarine is made. Any one making such assertions in regard to the fat is simply ignorant of the whole subject. When a fat has become in the least tainted, it can no longer be used for this purpose, as it is impossible to remove the odor from the fat after it has once acquired it.

**EXCISION OF THE PYLORUS.**—A case of resection of the pylorus, terminating fatally, is related by DR. VAN STERSON in the *Weekblad* of January 2d. He remarks that he has mentioned it intentionally, not to discourage or deter others from the operation; but from his own conviction that, when local and general circumstances are favorable, he believes the operation to be distinctly indicated. In the case mentioned, the patient died from want of strength to resist the shock of the operation, having previously suffered from vomiting and diarrhoea. The patient was a woman, aged fifty-one. When put under chloroform, the narcosis was calm and regular. A tumor was found in the pyloric region; there were no adhesions and no ulceration. The tumor affected the pylorus alone, and was very hard; on microscopic examination, it appeared to consist of a "tubular carcinoma," or "non-typical adenoma." After the tumor had been cut out, the stomach was found to be perfectly empty, a sponge, which had been introduced, returning quite clean. The mucous membrane of the stomach was not ulcerated. The cut ends of the duodenum and the stomach were carefully sutured together; a couple of camphorated ether injections were given to the patient, and she was laid in a warm bed. She roused sufficiently to be able to answer questions, and to state that she felt no pain, but her pulse was scarcely perceptible. Camphorated ether injections were continued every quarter of an hour, but in two hours and a half death occurred. There had been no particular difficulty in the operation, and no subsequent pain; but the patient had not sufficient vitality to survive the shock.—*The British Medical Journal*, April 24, 1886.

# THE MEDICAL NEWS.

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OF MEDICAL SCIENCE.

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PHILADELPHIA.

SATURDAY, MAY 15, 1886.

## THE NATURE OF INFECTIVE OSTEOMYELITIS.

THE nature of what is known as infective osteomyelitis is not as yet perfectly understood, although recent studies in the line of the germ theory of diseases have apparently done much to make it clearer than it once was. A microorganism was first observed in the pus of osteomyelitis in Germany, in 1874 and 1875, by Lücke, Klebs, and Eberth, and in France, in 1880, by Pasteur. After this a number of different observers endeavored to produce a similar disease, in otherwise healthy animals, by inoculation with what was believed to be the specific germ of infective osteomyelitis. These experiments have not yet proved conclusive, from the fact that it has heretofore seemed to be necessary to accompany the inoculation with some artificial injury of a bone or joint in order to bring about the condition which was looked for. Further, it has been claimed that this condition could be brought about with ordinary putrid materials, if their action was supplemented in a similar manner.

Last year a valuable contribution to this subject was made by DR. A. J. RODET, of Lyons (De la nature de l'ostéomyélite infectieuse, etc., *Revue de Chirurgie*, 1885), in which, after calling attention to the points already mentioned, he describes some experiments of his own. In these he made intravenous injections with the pus of osteomyelitis, or with a culture fluid, and in eight cases out of fourteen produced juxta-epiphyseal lesions of the bones having the characteristics of osteomyelitis. In one of his experiments, of which the details are given, he employed a culture of the thirteenth generation, and produced juxta-epiphyseal osteitis of both femora, of one tibia, and of one humerus. In studying

these experiments, Dr. Rodet remarks that the principal seat of the lesions was the medulla of the juxta-epiphyseal region, which corresponds with the views of Ollier. The periosteum was not much involved, and there was no true subperiosteal abscess. There was sometimes a separation of the epiphysis, but this was at the expense of the diaphysis. In a few cases the epiphysis also was invaded. The most notable exception to this rule is found in the upper end of the femur, where the lesions are habitually situated in the upper part of the neck, which is separated from the diaphysis by a connecting cartilage.

The form of osteitis which Rodet observed was rarefying; in exceptional cases it was condensing. He believes that what he produced was the same disease as that known in human beings as infective osteomyelitis, and that he has been able to supply the missing link in the theory which makes this depend upon a specific germ.

We cannot go quite so far as this. The experiments are interesting and instructive, and they seem conclusive. But we must not forget that they follow the work of other careful experimenters who failed to secure any such result. KRAUSE, for example, who reported experiments in the *Fortschritte der Medicin*, for April, 1884, concluded that inoculation of lower animals with the micrococcus of infective osteomyelitis, while always producing a disorder characterized by the formation of pus in various tissues, and having a predilection for the parts of the locomotor apparatus, does not produce one which can properly be said to resemble closely infective osteomyelitis in human beings.

It must be borne in mind that Krause speaks from Germany, while Rodet speaks from France, and more than this, from Lyons and the circle which surrounds Ollier. It must also be noted that Rodet used liquid culture media, while recent German students have thought that perfect isolation of specific microorganisms can be secured only by culture upon solid media. Such a difference of opinion is very material, and there still may be some doubt that Rodet has succeeded in demonstrating that the effects of his inoculations were attributable to the micrococcus of osteomyelitis.

### URETHAN.

THIS new hypnotic appears to have properties worthy of the attention of the profession. Chemically it is an ethylic ether of carbamic acid, and when pure consists of white rhomboidal crystals which are readily soluble in water. Schmiedeberg experimented with it upon animals, and von Jaksch, Jolly, and others have studied its action in man. In suitable doses it produces a deep, dreamless, natural sleep from which the individual awakens refreshed and without the unpleasant sensations which so often

accompany the use of a hypnotic. It does not appear to have any special action on the circulatory, respiratory, or excretory system. The effect of the drug seems to be exclusively upon the higher cerebral centres.

ELOY, in *L'Union Medicale*, Nos. 36 and 37, 1886, reviews its use in ninety cases which have been reported, including many of heart disease, phthisis, and neuralgia, in most of which it acted promptly and satisfactorily. In phthisis it seems also to allay the cough. Restlessness and insomnia, not pain, are the special indications for its administration. The dose as a sedative is from fifteen to thirty grains, and as a hypnotic thirty to sixty grains. It is not unpleasant to take, and is best given in a single dose.

If the statements regarding the action of urethan are borne out by subsequent experience, a very valuable agent has been added to the pharmacopœia—a powerful hypnotic acting on the higher cerebral centres, and without any of the unpleasant effects of morphia or chloral.

#### RECTAL EXPRESSION.

DOLÉRIS, in the number of the *Répertoire Universel d'Obstétrique et de Gynécologie* for March 10th, advises, as one of the means for preventing tears of the perineum, delivery of the head of the foetus by rectal expression. He attributes the method to Olshausen and Ahlfeld, and describes it as consisting in the introduction of two fingers into the rectum of the parturient toward the end of the expulsive stage, carrying them as far as the mouth or under the chin of the child through the recto-vaginal wall. Then with these fingers drawn in front and above, and by suitably directed gentle pressure, the deflection of the head, which is gradually elevated to the pubic arch, is effected or completed. The free hand may be used to assist this deflection. Two points are urged by Dolérís in rectal expression: First, let it be done in the interval of contractions; second, let it not be begun until the posterior angle of the anterior fontanelle is fully in the commissure.

Of course, the use of the fingers in the rectum for the delivery of the head is much older than the practice of Olshausen and Ahlfeld, but we have never been able to see how this method in itself furnished any greater security for the safety of the perineum than spontaneous delivery does. It can by no means increase the circumference of the vulvo-vaginal ring, and when that circumference is equal to the circumference of the foetal head, the latter passes through without doing injury to the former. External means are quite as efficient in retarding the exit of the head until the orifice, through which it is to pass, is sufficiently dilated, and in guiding the head in the axis of the final portion of the birth canal, while they are

much less repulsive; art should be an imitation of nature, and nature gives no hint for the performance of rectal expression.

## SOCIETY PROCEEDINGS.

### THE AMERICAN MEDICAL ASSOCIATION.

*Thirty-seventh Annual Meeting, held at St. Louis, May 4, 5, 6, and 7, 1886.*

(Specially reported for THE MEDICAL NEWS.)

MAY 7.—FOURTH DAY.

#### GENERAL SESSION.

##### The final report of

##### THE COMMITTEE ON NOMINATIONS

was then announced. The only Section that had reported, in addition to those given on the day previous, was that on Medical Jurisprudence, whose officers-elect were:

*President*.—I. N. Quimby, M.D., of New Jersey.

*Secretary*.—H. H. Kimble, M.D., of Minnesota.

##### GENERAL SHERMAN

was then called to the platform, and spoke a few words of compliment and respect. He referred to his own observations of the labors of the surgeons in the late war, and closed by assuring the Association of its cordial welcome to the homes of St. Louis, and expressing approval of such general assemblages of scientific men, which can only result in profit to the public as well as to themselves.

DR. CHAS. K. MILLS, of Philadelphia, then moved that the order of business be suspended in order to receive

##### THE REPORT OF THE JUDICIAL COUNCIL.

A motion to lay this motion on the table was then promptly made and carried.

##### THE REPORT OF THE COMMITTEE ON PUBLICATION

was then read by Dr. J. M. Toner. The report embraced the financial business of the publication of the *Journal of the American Medical Association* for the year ending March 31, 1886, being the last quarter of the second and first quarter of the third year of its publication. The journal, it stated, has been issued regularly, and without a single exception, either on or before the date of publication, has been mailed to the subscribers. At the last meeting of the trustees, the editor was instructed to publish the journal in the future on account of the Association, and during the last nine months it has been published in that way, from the publishing office of the Association.

The report of the editor was then read. The following are the principal facts embodied in it:

To members of the Association . . . . .	3050
To subscribers . . . . .	850
To exchanges and editors . . . . .	120
Total circulation at time of last report . . . . .	4020
To members of the Association . . . . .	3374
To subscribers . . . . .	645
To exchanges and advertisers . . . . .	252
Total circulation at present time . . . . .	4271



## The above indicates—

Net increase in membership during the year	324
Net decrease in subscribers " "	205
Net increase in exchanges and advertisers	132
Total number of journals printed weekly at present time	4500
Total number of journals printed weekly last year	4200
Net increase	300
Excess over mailing list	229

A considerable part of these copies are required for sample copies, etc., so that a reserve of seventy-five copies is kept for the purpose of completing files. The decrease in the number of subscribers was occasioned almost entirely by deaths and changes from subscribers to membership.

**Financial Report.** The receipts given relate only to moneys received at the office of publication from subscription, advertising, etc., and not to receipts from members and delegates, which is embraced in the report of the Treasurer.

Received from subscribers	\$2,738 29
Received from advertisers	2,165 07
Received from reprints and extra copies	427 10
Total receipts	\$5,330 46

Unpaid subscriptions accumulated during the past three years	\$5,435 00
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One-half of this, it is reasonable to believe, will be paid during the present year.

The report stated further that at the expiration of the contract with the printer, in last June, the Editor had, in accordance with the decision of the Board of Trustees, purchased the necessary type and fixtures for the publication of the Journal, at a cost of \$600, and that the saving in the expense of publication since work began in the new office, had amounted to more than the original cost of the outfit.

The report of the Trustees concluded by reviewing briefly the Editor's report, with the following summary:

Total receipts, as shown by the Treasurer's report	\$18,067 39
Total expenditures for the Journal	14,098 67

**DR. GARCELON** reported that the Auditing Committee had examined the report and found it correct in every particular.

## REPORT OF THE JUDICIAL COUNCIL.

**DR. J. M. TONER**, Chairman of the Judicial Council, made the following report: In the case of the protest against the admission of delegates from the *Tri-State Medical Society*, your Judicial Council would respectfully report that, as the Constitution of the Association recognizes delegates only from State societies and from such county and district societies as are in affiliation with their State societies, the *Tri-State Medical Society* not being in affiliation with such State society, its delegates are not admissible to seats in this Association.

In the case of the protest against admission of delegates from the *Davidson County Medical Society* of Tennessee, the Judicial Council reported that after careful examination of all printed, written, and oral discussion, they had decided that sufficient evidence had not been presented to warrant them in denying registration

to such delegates, but that the Council desired to admonish the said Davidson County Medical Society that it should put itself as soon as practicable, in affiliation with the State Society.

In the case of the protest against the admission of the *Mississippi Valley Medical Society's* delegates, the Judicial Council reported that the protest had been accompanied by no charges, and therefore the Council could take no action.

In the case of the protest against the *Philadelphia County Medical Society*, which, upon petition, was reopened to admit of the hearing of new testimony, the Council decided, after long and careful re-examination, including evidence not before presented, that notwithstanding the fact that the delegates from this Society hold documents usually held to entitle to membership, the methods employed for obtaining such papers were of such a character as to prohibit their being received. The Treasurer was further authorized to refund to delegates from this Society any money which he had received from them as dues. The delegates thus excluded were referred back to their County Society for final action.

**DR. EDWARD JACKSON**, of Philadelphia, announcing himself as a permanent member, as well as a delegate registered from the Philadelphia County Medical Society, requested information with regard to the present status of the delegates just excluded. Until the County Society shall have time for final action, are its delegates to be considered members of the Association or not?

No action was taken on the request.

**DR. JOHN B. ROBERTS**, of Philadelphia, then arose to offer a resolution, but was ruled out of order, and

## THE ADDRESS ON OPHTHALMOLOGY

was delivered by **Dr. Eugene Smith**, of Michigan.

Reference was made to the recent discoveries in regard to the action of cocaine, particularly to the occasional toxic action it exerts, and he advised that in all cases it should be tried first in the strength of one per cent., until its action on the patient has been demonstrated, when the strength of the solution employed may be increased to three or four per cent.

He stated that recent experiments had placed the operation of transplanting the conjunctiva of the rabbit upon the human eye, among the recognized operations. Clinical experiences and careful study have demonstrated, that in sympathetic conjunctivitis the inflammation travels along the optic nerve to the unaffected eye. Referring to the use of antiseptics, he stated that they should always be combined with other means for the prevention of suppuration—above all, with careful observation of cleanliness.

Cocaine, he continued, has taken its place in the treatment of painful affections of the ear. A four per cent. solution is usually employed. Bad symptoms have followed its use in but a few cases. The dry treatment of otitis media suppurativa, although strongly advocated by some, has been decided as being applicable to but a certain class of cases, others improving more rapidly under other methods. The discovery of a causal relation of certain local pathological conditions of the nasal chambers to pulmonary diseases, has been an important advance.

The relation of the same diseases to asthma, chorea,

and epilepsy, has also been demonstrated by cure by appropriate treatment. Reference was made to the application of electricity to the removal of adventitious tissue from the nasal cavities.

During the year, the intubation of the larynx has been practised to an extent and with a result that are truly remarkable. It is an operation that bids fair to supplant tracheotomy for the relief of laryngeal affections. Its introduction is due to Dr. O'Dwyer, of New York. Great improvement has also been made in the process of photographing the laryngeal image.

#### THE REPORT OF THE SECTION ON STATE MEDICINE

stated that the officers nominated for the ensuing year were:

*President.*—G. H. Rohé, M.D., of Baltimore, Md.

*Secretary.*—Walter W. Wyman, M.D., of the Marine-Hospital Service.

Regarding the petition presented by the National Women's Christian Temperance Union, the Section had

*Resolved*, That we reiterate the utterances of the American Medical Association in regard to the evils arising from the use of alcohol, and recommend that a committee be appointed to consider the matter of the memorial to Congress, and report at the next meeting.

In regard to the memorial on the subject of cremation, a committee was appointed to consider the matter, and report at the next annual meeting.

It was recommended that the Association appoint a committee of three to report at the next meeting a form of

#### LAW REGULATING THE PRELIMINARY EDUCATION

which shall be deemed necessary of candidates to study medicine, the course of study they shall pursue, and the manner in which they shall be licensed to practise, the enactment of which shall be recommended to the Legislatures of the different States.

The report was adopted.

#### MISCELLANEOUS BUSINESS.

DR. JOHN B. ROBERTS, of Philadelphia, offered the following resolutions regarding the

#### EXCLUSION OF THE DELEGATES OF THE PHILADELPHIA COUNTY MEDICAL SOCIETY.

*Resolved*, That President Brodie be respectfully requested to inform the meeting, at this moment,

*First*. Whether the report of the Judicial Council in the matter of the Philadelphia County Medical Society was given to the Chair by a member of the Council (Dr. Marcy) on Wednesday, with the request that it be presented to the Association at the conclusion of Dr. Senn's Address.

*Second*. If so, did the President or Permanent Secretary make an effort to present it at that time?

*Third*. Did the President or Permanent Secretary know the contents of the report of the Judicial Council?

*Fourth*. Do the by-laws of the Association, on page 26, require the decisions of the Judicial Council to be reported to the Association at the earliest practicable moment, and are such decisions there declared to be final, and unchangeable by any action of the Association?

*Fifth*. Did the Permanent Secretary introduce any items of new or miscellaneous business between the re-

port of the Rush Monument Committee and adjournment?

*Sixth*. Did he, at that time, make any effort, by public statement, to read the report of the Judicial Council?

*Seventh*. Has the Permanent Secretary, at previous meetings, ever requested that the motion to adjourn be postponed a single moment, until a matter of important business, requiring no action, be introduced?

*Eighth*. Did the Permanent Secretary, at this time, make any such request, and if not, was it not his duty to do so, under By-law II., page 26?

*Resolved*, That President Brodie be respectfully requested to inform the Association at this moment,

*First*. Whether the report made yesterday by Dr. Gihon, on the recommendations contained in the President's Address, was on the order of the day.

*Second*. Why Dr. Roberts's request that the Permanent Secretary state why the report of the Judicial Council was not read yesterday was not answered.

*Third*. Under what parliamentary law was the motion of Dr. Roberts, asking information as to why the Permanent Secretary had not read the report of the Judicial Council on the previous day, ruled out of order, because not a part of the order of the day, when immediately afterward Dr. Toner was allowed to introduce and obtain a motion relative to the Judicial Council, though this was not a part of the order of the day.

*Fourth*. Why Dr. Toner's motion asking that the Report of the Judicial Council be returned to the Judicial Council was necessary, when the Chair had stated in reply to Dr. Jackson that it could not be presented by the Permanent Secretary of the Association, because it was in the hands of the Judicial Council.

*Fifth*. What is the status of the delegates of the Philadelphia County Medical Society, at the present time, when, as is well known to the Association, their credential fees have been received by the Treasurer, and proper papers entitling them to seats in the Association have been duly issued to them.

*Resolved*, That the Judicial Council be requested to consider the propriety of changing the manner of taking evidence in cases of contestant delegations.

DR. J. A. OCTERLONY, of Kentucky, moved that the resolutions just read be laid upon the table. Carried.

A motion to reconsider this motion was defeated.

The Chair then announced as the Committee to consider

#### THE ADVISABILITY OF MODIFYING THE ORGANIC LAWS

so as to organize branches, and to suggest means, if desirable, for the attainment of the same, as follows: The President, the President-elect, and the four Vice-Presidents, as required in the motion, Drs. N. S. Davis, of Chicago; A. L. Gihon, of the U. S. Navy; and J. M. Toner, of Washington, D. C.

The President announced the following appointments:

#### DELEGATES TO EUROPEAN SOCIETIES

N. S. Davis, M.D., of Chicago; W. T. Briggs, M.D., of Nashville; William H. Pancoast, M.D., of Philadelphia; S. C. Gordon, M.D., of Portland, Me.; J. V. Shoemaker, M.D., of Philadelphia; E. Cutter, M.D., of New York; E. Smith, M.D., of Detroit; W. W. Dawson, M.D., of Cincinnati; D. McLean, M.D., of Ann Arbor; B. A. Watson, M.D., of Jersey City, N. J.; William Brodie,

M.D., of Detroit; L. H. Montgomery, M.D., of Chicago.

To the Ontario Medical Society, H. O. Walker, M.D., of Detroit.

To the Canada Medical Society, William Brodie, M.D., of Detroit.

#### INOCULATION OF YELLOW FEVER.

DR. GASTON, of Atlanta, Georgia, presented a resolution, the purport of which was that, in view of the fact that well-authenticated reports have been received of the successful inoculation with attenuated virus of yellow fever poison, in proof of which Dr. Horace Allen, now present, testifies that he was inoculated and afterward passed through an epidemic of the disease at Rio Janeiro, without contracting the disease, while many others died of it; and in view of the fact that reports have been published which indicate the safety of the procedure, the Association, therefore, petition Congress to appoint a scientific commission and appropriate sufficient funds for an investigation of the method and its success. The resolution was adopted.

#### A RESIGNATION.

DR. JOHN B. ROBERTS, of Philadelphia, offered his resignation of the office of Secretary of the Section on Anatomy and Surgery, in view of the fact that the delegation of the Society of which he was a member had been excluded from the Association. On motion, the resignation was accepted.

#### EXPUNGED FROM THE MINUTES.

DR. A. E. BALDWIN, of Chicago, then moved that as certain resolutions offered by Dr. Roberts were of a character which cast a reflection on the conduct of our excellent President and Permanent Secretary, therefore, that all allusion to said resolutions be expunged from the minutes of the Association. Carried.

DR. JACKSON, of Philadelphia, then read

#### A PROTEST AGAINST THE ACTION OF THE JUDICIAL COUNCIL

by which the Philadelphia County Medical Society, one of the oldest, most respectable, and the largest of the medical societies in affiliation with this Association, has been excused from recognition at this meeting. A motion to table the protest was promptly made and carried.

DR. N. S. DAVIS, of Chicago, moved

#### A VOTE OF THANKS

to the Committee of Arrangements, to all the local officers, and to the people of St. Louis, from whom such cordial courtesies and such kindly treatment had been received. Adopted.

#### AMENDMENT TO THE BY-LAWS.

DR. KELLER, of Arkansas, offered an amendment repealing that adopted at the present meeting by which the Sections nominated their own officers.

Drs. Davis and Johnson were then appointed a committee to introduce

#### THE PRESIDENT-ELECT,

Dr. Gregory, of St. Louis.

DR. GREGORY accepted the office with a few appropriate remarks expressing his sincere gratitude for the honor conferred upon him.

DR. BRODIE, after a few words of thanks to the members of the Association for the manner in which they had supported and aided him in the discharge of his duties, and after congratulating them on the pleasant manner in which all matters on which there existed a difference of opinion had been adjusted, leaving no personal ill-will between any of the members, declared the Association adjourned.

#### AMERICAN SURGICAL ASSOCIATION.

*Seventh Annual Session, held at Washington, D. C., April 28, 29, and 30, and May 1, 1886.*

(Specially reported for THE MEDICAL NEWS.)

#### THIRD DAY, APRIL 30.—MORNING SESSION.

DR. T. F. PREWITT, of St. Louis, read a paper on

#### TRAUMATIC ANEURISM OF THE INTERNAL CAROTID ARTERY.

In referring to the rarity of aneurismal disease of this artery, he said: In 1842, Mr. Syme, speaking of spontaneous aneurisms, declared that "Aneurism of the internal carotid, external to the cranium, does not seem to have been ascertained or recorded." Some of our latest standard authorities—among them Holmes—ignore it entirely, in discussing the subject, while others speak of the possibility of its occurrence. Ashhurst alludes to it incidentally; Agnew states that the internal carotid may be subject to aneurism in its *cervical*, *petrous*, and *intracranial* portions; Erichsen does not mention it; Gross refers to it as having occurred in a few instances; Bryant makes no mention of it. Yet, scattered through the literature of the last half century are a number of cases of spontaneous aneurism of this artery. The rarity with which we meet with aneurism in this artery is explained by its almost complete exemption from the degenerative changes which affect arteries in other portions of the body.

Of cases of traumatic aneurism, he had been able to find upon record but a single case—that of Dr. W. T. Briggs, of Nashville. This was the result of an incised wound, and was operated upon successfully in 1871, the condition being such as to permit a ligation of the internal carotid. In consequence of the sheltered position and great depth of this vessel, it is rarely wounded; and, when this is the case, the accident is usually rapidly fatal.

He has not been able to find upon record, in the literature accessible to him, any reference to gunshot injury of the internal carotid followed by aneurism. The following case, therefore, seems without a counterpart in the annals of surgery:

Eliza J., colored, æt. seventeen, was shot by her husband in the latter part of December, 1884, or 1st of January, 1885, the weapon used being a revolver carrying a ball of 32 calibre. At the moment of firing he stood about two feet distant from her, and a little to her right. The bullet entered the cheek over the malar bone, a little anterior to its junction with the zygoma, ranging backward. The shot was followed by immediate and profuse hemorrhage from the wound of entrance, there being no wound of exit. This was controlled by pressure. The patient stated that there was also hemorrhage from the ear at the time of shooting,



and that it occurred two or three times afterward; and hemorrhages from the mouth and nose after rising in the morning. Some swelling occurred immediately between the ramus of the jaw and the mastoid process. This swelling has been growing larger and larger, until now, April 2, 1885, it projects into the pharyngeal cavity, crowding the tonsil over to the median line, and resting against the uvula. Externally it extends from the inferior surface of the petrous portion of the temporal bone above, to the level of the hyoid bone below. The tumor pulsates in every direction, and has a marked aneurismal bruit and thrill. The walls of the sac seem thin, especially upon the pharyngeal side.

Immediately after the shooting there was paralysis of the pharyngeal muscles of the right side, and the patient lost the sense of taste on the right side of the tongue, which, when projected, inclined to the right side. It is somewhat atrophied and deeply furrowed on this side. Pressure on the common carotid arrests pulsation in the tumor, and causes it to decrease somewhat in size. There is no difference in the pulsation of the right and left temporal arteries; no difference in size of the pupils, which respond normally. Pain has increased of late, and is needle-like in character. She has persistent headache. Ever since the shooting, there has been a roaring sound in the right ear when the patient lies upon that side. Paralysis of right vocal cord greatly impairs the voice. Appetite poor; patient emaciated; swallowing difficult, owing to regurgitation of fluids and inability to take solids.

Having concluded that he had an aneurism of the internal carotid artery to deal with, he decided to operate upon it. This he did April 4, 1885, assisted by Dr. A. L. Brokaw, Professor Tuholske, and others. Ligation conducted in the usual manner arrested the pulsation for a time, but this soon returned. He decided to extend the incision upward in front of the tragus, with the forlorn hope of being able to lay open the sac and tie on its distal side. It was found, however, impossible to reach the trunk in that direction, and all further attempts were abandoned, and the wound was dressed. The case did well until, on the twelfth day, a secondary hemorrhage occurred. The day following he was able to thrust his little finger into the opening whence the blood flowed. Strips of lint were then rolled in iodoform and crowded into the sac, with the effect of completely stopping all hemorrhage. The patient did well, except that her temperature ranged from  $101^{\circ}$  to  $103^{\circ}$  until the 29th (twenty-five days after operation), when death occurred from exhaustion. Epileptiform convulsions also set in ten days after the tenting of the sac, involving the facial muscles and the flexors of the arms and hands. The fever was doubtless septic.

A hasty post-mortem, made in part under the direction of the coroner, confirmed his opinion in regard to the nature and extent of damage done to the internal carotid, but badly damaged the specimen, the strips of lint having been removed before he had an opportunity to witness their position in the sac.

In speaking of the diagnosis of aneurisms of this vessel, he said that this would rest on the same principles that form the basis of diagnosis of aneurisms of the carotid system. The greatest danger of error would lie between aneurism and abscess in this region.

Aneurism of the common carotid at its bifurcation is the usual situation when in the upper portion of the vessel, and its superficial position and spontaneous origin would practically determine the diagnosis. Neither would this project into the pharynx, as would aneurism of the internal carotid. Aneurisms of the external carotid and vertebrals are, with the rarest exceptions, traumatic. The direction of the wound would also aid in diagnosis. Lying below the muscles, aneurism of the internal carotid would not project outward to a marked degree. In the case reported, Dr. Prewitt was aided in his diagnosis by the symptoms indicating injury of the glosso-pharyngeal and possibly the pneumogastric nerve, and nowhere is there such juxtaposition of artery and nerve as to permit wounding of both, as at or near the carotid foramen. This sufficed to make the diagnosis a positive one, in spite of the great projection of the tumor beyond the surface.

In regard to treatment, none of the usual methods was indicated in this case, except ligation. The failure of the operation to arrest permanently the flow of blood into the aneurism was easily explained on the ground of an abnormally free collateral circulation.

With regard to the cause of death after ligation of the common carotid artery, he quoted Dr. Norman Cheever, who speaks of the frequency of cerebral symptoms in those who do not die at once, and the contrary statement by Sir William Ferguson. In the case reported to-day, there were no cerebral symptoms until the nineteenth day, when convulsions occurred, due rather, as he supposed, to a thrombosis of the sinuses than to diminished blood-supply to the brain.

DR. J. FORD THOMPSON remarked that he had never seen a case of traumatic aneurism of the internal carotid external to the cranium, and judging from the small number of cases that have been reported, he thought it probable that such an experience fell to the lot of but few. The diagnosis in the case of Dr. Prewitt seemed to be perfectly clear. He did not believe that, as a rule, the diagnosis of traumatic aneurism of this vessel would be a difficult matter, although the source of hemorrhage might, for a time, remain a matter of doubt. The bulging of the tumor would be almost pathognomonic. A case is reported by M. Ferrier in which the bulging internally of the tumor was a marked characteristic. The case terminated fatally before operative measures had been resorted to. M. Récamier was called in to see the patient, and while in the act of examining him the abscess aneurism ruptured, and the patient died in a few moments. Neufarth, in 1851, reported a case following a blow upon the right side of the head, in which the internal protrusion of the tumor was observed. This case also terminated by a hemorrhage into the fauces. The autopsy established the correctness of the diagnosis.

A number of cases of intracranial aneurism of this vessel have been reported, but they are, of course, foreign to this discussion.

With reference to the case of Dr. Briggs, he remarked that it was one of great interest, and probably the only one of exactly that character on record. The only case of which he was aware that at all resembled it, and that for the most part in the method of operation employed, was that of Mr. Syme, reported in 1851. Syme's case was not, however, an aneurism of the in-

ternal carotid. This case was one in which the operator had, before entering upon the operation, clearly studied out his diagnosis and the exact steps of the operation he purposed employing. The steps of the operation were closely described by the speaker. It was, he continued, one of the most brilliant surgical feats of that or of all time, and was, he thought, looked upon by Mr. Syme to his dying day as the great triumph of his life. He further suggested the possibility that Dr. Briggs had been guided in his method of operation by the report of this case, but, however that was, he deserves great credit for his success.

The case of Dr. Prewitt, he said, is open to the criticism that it exposed the patient to a severe and dangerous operation without affording any relief from the suffering. It was of interest to us, however, as demonstrating the uselessness of ligating the common carotid for aneurism of the internal carotid. He thought it would have been better if the operator had followed the course of Dr. Briggs, or that proposed, although not yet tried, by Mr. Guthrie. The steps of the latter operation were reviewed. Preference for Syme's operation was expressed.

There is nothing more difficult than to determine what is the best course to pursue in a case of this kind. This is made apparent when an operator like Récamier permitted a patient to die of hemorrhage right under his eyes. Many cases would probably terminate as well if let alone as if subjected to operation. Where operation is performed, the sac should be opened and the vessel ligated at both ends where this is at all possible. It is not to be inferred, however, in a case in which ligation does not stop the pulsation in the sac, that the operation can be of no benefit. We frequently see reported cases of ligation for traumatic aneurism by the Hunterian method. This the speaker thought entirely wrong, as that operation is in no way applicable to this class of aneurisms.

DR. BRIGGS then narrated the accident by which he was "innocently" brought into the case to which reference had been made by the previous speaker. The operation was performed before a class of students, and was entered upon before the operator had any definite idea of the condition for which it was required. The vessel was simply dissected out until the point of injury was reached, then the sac was opened and ligatures applied. The patient still lives. The previous speaker, he continued, was correct in his supposition that he had proceeded in the case according to the method of Syme, as he had that case in mind, as well as the statement of Guthrie, that nothing will stop the regurgitation of blood into the sac, short of ligation on both sides of the aneurism.

DR. D. HAYES AGNEW stated that about three weeks ago, a lady from New Jersey came under his care at the Pennsylvania Hospital, with a tumor as large as an orange, just behind the angle of the jaw, and projecting internally into the pharynx. It had grown slowly for about eight months, and was attributed by the patient to a blow she had received on the side of the head. He found that by making pressure on the internal carotid, the tumor was reduced materially in size. It had a distinct pulsation and a distinct bruit. He was led to believe that the case was one of aneurism of the internal carotid artery. He operated, tying the primitive carotid

immediately above the omo-hyoid. Most of the pulsation was arrested, but there was still some pulsation. This, he concluded, was from communication with the external vessel. The incision was at once prolonged, and the external thyroid tied, almost completely arresting pulsation. He then tied the lingual, and the pulsation entirely disappeared. The patient did well for a week, but at the expiration of that time pulsation again appeared. He found that upon making pressure on the carotid of the opposite side, all pulsation and sound disappeared. The tumor was very large and the integument over it very thin; the mucous membrane covering it on the internal side was also thin. He was called away from the city, however, and left, supposing that the patient would do well, being absent but a day. Ulceration occurred in the tumor, and there was a large gush of blood into the fauces. One of the internes attempted to arrest the hemorrhage by filling the cavity, but the patient died of septic poisoning a few days after. Although this case was one of spontaneous aneurism of the internal carotid, he thought it had a bearing on the subject before the Association. He had himself decided that if rupture occurred he would divide the jaw, expose the tumor, and tie on both sides. This operation, he thought, should be a primary one, performed promptly, without waiting to experiment with other methods.

DR. A. VANDERVEER said that he thought the remarks of Dr. Agnew were in the right direction, but there are cases in which he thought it better to resort to other methods before a radical operation is attempted. He then narrated a case that had occurred and been treated by him in 1882. The patient was a strong farmer, accustomed to hard work. He stated that during the fall preceding, his work compelled him to hold his head almost constantly to the right side. By the preference of the patient, compression was resorted to. After six days of this treatment, the tumor was reduced in size and appeared firmer. The patient returned home. In two months he came back; the tumor was as large as it had been before, and the wall seemed a little thinner. Compression was tried for six days continuously, with a marked diminution in the size of the tumor—so much so that it did not enlarge when the compression was suspended. He was sent home with only a compress on the tumor. He appeared to be in good health and did well for four or five weeks, when he suddenly complained of a severe pain in his head, and fell dead. A post-mortem examination was made, but it failed to reveal the rupture of any vessel, hemorrhage, emboli, or, in fact, anything that could account for his death. The specimen of the artery which was sent to the speaker showed that there was a slight dilatation of the vessel, but that the walls were very much thickened, and firm.

DR. L. McLANE TIFFANY remarked that there was between the two cases reported, the most marked difference, to which attention had not been called. One was so far away from the skull that it could be treated according to the ordinary rules of surgery, while the other was so close to the skull that a distal ligature could not be applied. It is doubtless proper in all cases to apply the distal ligature, where this is possible. He then narrated the case of Dr. Twitchell, of New Hampshire, reported in 1805. A young man had part of his neck shot away in a Fourth of July celebration. One day, while Dr. Twitchell was in the house, the vessel

gave way. He put his finger into the rent, stopped the hemorrhage, ligated below the rent, removed his finger, and found the hemorrhage as free as ever. Concluding that there was not room to put a ligature above, he put on a graduated compress, and the patient recovered.

The only possible improvement in the treatment of Dr. Prewitt's case would have been the laying open of the sac. It would have been proper also to make compression above the wound, pressing up against the base of the skull, afterward treating the wound itself by compression.

With regard to the division of the jaw, the speaker thought it a measure to be decided upon only in presence of a case. The speaker then narrated a case of post-scarlatinal abscess which eroded the internal carotid of a child, between three and four years of age. There was marked swelling of the abscess developing rather suddenly, indicating that the bloodvessels had ruptured into the abscess. The cavity was opened by the speaker and Dr. Smith, of the same city, the contents quickly evacuated, the point of rupture found and closed by the finger, and the bloodvessel ligated.

DR. BRIGGS stated that there had been a misunderstanding of his case on the part of a previous speaker, inasmuch as the opening in the vessels had been very close to the carotid foramen.

DR. PREWITT, in closing the discussion, remarked that if he had read the case of Ferrier and Récamier aright, the diagnosis had not been properly made, and that it had not been treated as a case of aneurism, as supposed by Dr. Thompson. It had been treated as an abscess. When Récamier was called in to see the case the throat had never been inspected, and it was while he was in the act of forcing the child's jaws apart that the aneurism burst. He agreed fully with that speaker that the old operation is the preferable one where it can be performed, but he was confident that an examination of the specimen from his case would show that the operation could not have been performed in his case. He agreed also with Dr. Agnew as to the advisability of dividing the jaw and turning away the ends in order to expose the vessel. In this case, however, he feared that the vessel was too closely adherent to the jaw to admit of its being sufficiently separated therefrom to permit of the division of the jaw.

With reference to compression, he said that he had no doubt that it would act well in certain cases, but that in a case like this he would be afraid to wait long enough to attempt it; this was in reality his reason for not doing so, as the method had been proposed. It would have been a bold undertaking, the speaker continued, to have opened the sac in his case. True, it could have been stuffed if hemorrhage had occurred, but he was of the opinion that the lint that was introduced was in part, at least, to blame for the fatal termination.

#### THE AMERICAN CLIMATOLOGICAL ASSOCIATION.

*Third Annual Session, held at Philadelphia,  
May 10 and 11, 1886.*

MONDAY, MAY 10.—FIRST DAY.

THE Association met in the Hall of the College of Physicians, and was called to order at 3 o'clock P. M.,

by THE PRESIDENT, WILLIAM PEPPER, M.D. of Philadelphia.

#### THE PRESIDENT opened the session with an address on THE CAUSES AND DISTRIBUTION OF CONSUMPTION IN PENNSYLVANIA.

He wished this to be considered simply as a preliminary report. The data obtained, while not sufficient to warrant any positive conclusions, seemed to indicate that consumption is most prevalent in the counties of low altitude, where the rainfall is greatest, and that the number of deaths in proportion gradually diminishes as higher elevations with a smaller rainfall are reached, until when an altitude of 2000 feet is obtained, the death-rate has diminished to less than one per 1000.

The city of Philadelphia was separately considered. In a period of twenty-six years it was found that there had been 60,000 deaths out of a total of 400,000, the rate for each year being quite uniform. The rate among negroes is over twice that of the general population. Among the foreign population the death-rate is also in excess of the people at large. Deducting the deaths among negroes and foreigners, the true mortality among the Americans in Philadelphia is much lower than is commonly believed. The percentage of deaths from consumption as compared with the total number of deaths is by this method nine and a half per cent., as contrasted with fourteen per cent., the rate when all classes are included.

DR. A. L. LOOMIS, of New York, then read a paper on  
THE EFFECT OF HIGH ALTITUDES ON CARDIAC DISEASE.

In the summer of 1880, while at St. Regis Lake, in the Adirondacks, he was requested to see a gentleman who had just arrived, and was thought to be dying. The patient, aged forty years, was found gasping for breath, cyanosed, with no apparent radial pulse, and bathed with profuse perspiration. Neither heart sound could be heard. Under the hypodermatic use of digitalis, morphia, and brandy, he improved. The following day it was learned that he had left New York apparently perfectly well. When he reached an elevation of 1000 feet, his breathing became difficult, and as a higher altitude was reached the difficulty was increased, and was accompanied by cardiac palpitation and a sense of oppression in the epigastrium. When he reached St. Regis Lake, at an elevation of 2000 feet, he appeared to be dying. Physical examination showed well-marked dilatation of both ventricles, with a loud systolic murmur heard over the præcordia and transmitted a little to the left. At the end of three days he returned to New York. As he reached lower levels, the difficulty of breathing diminished, and when he reached the level he could walk. The irregular heart action however continued, and the feet soon became œdematous, and he died six weeks later with general anasarca and heart insufficiency. No autopsy was made. The patient had never presented any evidence of cardiac disease prior to his trip to the mountains.

Dr. Loomis had seen in all twenty-six similar cases, the histories of five of which were given.

In all the cases coming under his observation the ventricular dilatation was unquestionably the cause of the sudden development of distressing symptoms, and the commencement of the fatal issue seemed to be



directly due to the effects on the cardiac circulation of a change from a lower to a higher altitude. The probable explanation of these cases was then considered. He first referred to the nervous supply of the heart. The quality of the atmosphere, which is probably the only operative factor under the circumstances, is the diminished density.

The two important elements leading to permanent cardiac insufficiency are, first, the condition of pulmonary distention consequent upon rarefaction of the atmosphere; and second, the resultant condition of the circulating blood. In the first, the terminations of the vagus are excited by the distention of the lungs; by the excitation of these afferent fibres the cardiac walls and inhibitory ganglia of the medulla are paralyzed or weakened. The inhibitory control being lost, the diastolic intervals are shorter and the rhythm increases, but the amount of work accomplished is not proportionate to the visible cardiac energy. The change in the blood which acts as an important, and ultimately the principal factor in producing the cardiac insufficiency, is the deficiency in oxygen. The vasomotor centres, influenced by the want of oxygen in the blood-supply, excite a general contraction of the arterioles of the body, filling the veins and affording a large heart-supply, while the arterial pressure rapidly rises as the peripheral resistance is increased. Ordinarily, the heart would relieve itself by excitation of the cardio- and vaso-inhibitory centres, but these centres are held in abeyance by the condition of the blood circulating in the medulla. This increase in the intracranial pressure cannot continue, and sooner or later the heart passes into a state of diastolic relaxation, which is the primary step of a condition of ventricular dilatation. It is not improbable that the blood heavily laden with carbon dioxide, also acts as a disturbing factor of the normal action of the heart through this same afferent mechanism.

If the explanation of the effects of high altitude upon the cardiac circulation be accepted, the risk which one with even slight cardiac insufficiency runs by passing from a lower to a higher altitude is certainly very great, and if the insufficiency is extensive, such changes become immediately dangerous. It must be remembered that cardiac insufficiency may exist in those who give no evidence of it.

Clinically, he relied upon what is termed the muscular element of the first sound of the heart in determining the condition of the muscle walls. The absence of the muscular element of the first sound indicates a failure in the integrity of the heart power, which would lead him to caution such a one against passing rapidly from a lower to a higher altitude. Clinical experience had also convinced him that it was unsafe for one to make such change whose cardiac rhythm was greatly disturbed by nervous excitement by rapidly ascending a long flight of stairs.

DR. FRANK DONALDSON, JR., of Baltimore, then read A PRELIMINARY ACCOUNT IN REGARD TO CIRCULATORY AND RESPIRATORY CHANGES OBSERVED IN ANIMALS PLACED IN THE PNEUMATIC CABINET.

The experiments had been performed by Professor H. N. Martin, of the Johns Hopkins University, and the writer. The animals employed were rabbits, which had been chloralized. It was found—

1. When the animal is breathing air from outside of

the cabinet, rarefaction of air within the cabinet causes a marked fall of general arterial pressure, but has no influence on the pulse-rate. The fall of pressure lasts only a short time (ten to twenty seconds), and is often followed by a temporary rise above the normal.

2. This fall of systemic arterial pressure depends on two factors: greater flow of blood to the skin when the air around the animal is rarefied, and greater accumulation of blood in the lungs when they are distended.

3. Of these two factors, accumulation of blood in the lungs is the more effective, for if the animal breathes air from the cabinet, and not from the outside, rarefaction of the air within the cabinet (in this case accompanied by no special expansion of the thorax) has but a trivial effect in lowering arterial pressure.

4. When the animal is breathing external air, rarefaction of the air within the cabinet usually has no effect upon the respiratory rate nor upon the extent of individual respiratory acts, unless the fall of blood-pressure be considerable. If it be considerable, symptoms of anæmia of the medulla oblongata show themselves. In some cases there is more forcible dyspnoic breathing, and, in some, dyspnoic convulsions similar to those which occur when an animal is bled to death, and due to the same cause, viz., deficient blood flowing through the respiratory centre.

5. The rapid recovery of general arterial pressure, while the animal is still in a rarefied atmosphere but breathing external air, is probably due to excitation of the vasomotor centre, which, as is well known, is excited whenever the blood supply is defective.

6. The brain, enclosed in a rigid box which is practically unaffected by variations in the atmospheric pressure, has its circulation more disturbed in the pneumatic cabinet than any other organ, with the exception of the lungs.

7. Compression of the air within the cabinet while the lungs are in communication with the external air, causes a considerable transient rise of blood pressure. This is probably mainly due to the forcing of the blood from the cutaneous vessels, but there has not yet been sufficient time to investigate this point thoroughly.

8. Compression of the air within the cabinet while the lungs are in communication with the external air, slows the pulse as the arterial pressure rises. This is probably due to excitation of the cardio-inhibitory centre by increased intracranial blood pressure. Further experiments are, however, necessary before this can be positively stated.

9. In certain cases when the air within the cabinet is rarefied and the animal is breathing external air, the respiratory movements cease altogether for several seconds. As to the cause of this physiological apnoea, we are not yet ready to form an opinion. It may be due to extra accumulation of air in the alveoli of the lung, or to distention of the lungs, exciting those fibres of the pneumogastric which tend to check inspiration.

These papers were discussed by Drs. Pepper, Bruen, and Hudson.

#### EVENING SESSION.

The first paper of the evening was entitled

#### A CLINICAL REPORT OF CASES TREATED BY PNEUMATIC DIFFERENTIATION.

by DR. H. F. WILLIAMS, of Brooklyn.

The reading of the paper was preceded by a demonstration of the cabinet, showing the different methods of application of the apparatus. The speaker reported forty-five cases in which the cabinet had been employed, and described sixteen cases in detail.

DR. V. Y. BOWDITCH, of Boston, then followed with a paper on

#### TEN MONTHS' EXPERIENCE WITH PNEUMATIC DIFFERENTIATION.

He gave the clinical results of the treatment of twenty-seven cases since June 30, 1885. Pulmonary phthisis, in its tubercular and non-tubercular forms; bronchitis, in its acute and chronic forms, with and without emphysema or asthma; and retraction of the lung from longstanding pleuritic effusion, were the diseases which he had treated in the pneumatic cabinet. His experience was such that, although he had been unable to accomplish thus far such brilliant results as some others had claimed, yet he felt convinced of the very marked beneficial effect of the cabinet in many cases where other means had failed to give relief, and of its curative power in one case of incipient tubercular trouble, and he looked forward with hope to what may be done in the future with this new method of treatment.

#### THE PHYSICS AND PHYSIOLOGICAL ACTION OF PNEUMATIC DIFFERENTIATION.

DR. J. H. PLATT, of Brooklyn, said he believed that the effect of reduced air-pressure upon the periphery of the body is to increase the expansion of the thorax in inspiration, and to diminish its contraction in expiration, consequently to increase the amount of residual air. By the increased pressure in the lungs it will tend to exsanguinate them, and to raise the arterial blood-pressure in the general circulation. He believed that such benefit as results from the use of the cabinet is due mainly to the reduction of congestion in the lungs by the air-pressure within them, and by the increased expansion and movement of the lungs favoring their greater action, and modifying their nutrition.

THE PRESIDENT, in calling for discussion upon the preceding papers, referred to the apparatus of Waldenberg and the neglect of any reference to this method of treatment in most papers on pneumatic differentiation. The use of this apparatus, with proper hygienic and dietetic restrictions, is so gratifying that it cannot be forgotten in a discussion of this kind. It must be remembered that this plan of treatment is simply an adjuvant to hygienic and dietetic treatment.

DR. LOOMIS, of New York, considered that the most useful application of the pneumatic cabinet was in pulmonary gymnastics. He had never seen any evidence that sprays or vapors reached the lungs, and he had never seen any effect on the bacilli from these.

There are certain cases of phthisis which always present a sluggish circulation of the periphery, and which pass rapidly from one stage of the disease to another. In these cases the use of the cabinet in the Sanitarium in the Adirondacks had an exceedingly favorable influence upon the capillary and general circulation, while the pulmonary lesions remained without change. Such patients have gained in weight and flesh. The use of the instrument is not to be confined to pulmonary disease. In anæmia and nervous diseases, with feeble circulation, the apparatus may be found of benefit.

DR. J. SOLIS COHEN, of Philadelphia, thought that the results recorded from the use of this apparatus were no better than those obtained by older and simpler forms of apparatus. He reported patients in advanced stages of phthisis whose lives had been prolonged ten years by the use of the Waldenberg apparatus. He agreed that the principal advantage was from the pulmonary gymnastics.

TUESDAY, MAY 12.—SECOND DAY.

#### MORNING SESSION.

The report of the Committee on Health Resorts was received and ordered printed in the proceedings.

DR. ROLAND G. CURTIN, of Philadelphia, then read a paper on

#### ROCKY MOUNTAIN FEVER.

From his own experience and from correspondence with residents in Colorado, he concluded that Rocky Mountain fever is not a specific fever. Under this head he thought that probably there had been classed cases of typhoid fever, typho-malarial fever, and ordinary continued fever. In these altitudes, these diseases are undoubtedly largely modified by the conditions present. The various influences which might tend to alter the aspect of the disease were then referred to.

DR. E. W. SCHAUFFLER, of Kansas City, confirmed this opinion.

DR. C. C. RICE, of New York, then spoke of

#### HOW THE THERAPEUTIC VALUE OF OUR MINERAL SPRINGS MAY BE INCREASED,

and presented the following conclusions:

1. Physicians should make a careful analysis of our mineral springs.
2. The medicinal value of the waters should be tested by clinical investigation, and the conclusions published for the benefit of the profession.
3. If the waters are found to present marked merit, the physician should interest himself in developing the springs, improving the baths, etc.
4. Physicians, in sending patients to the springs, should be more careful to select the proper water, and should send with the patient the diagnosis and history of the condition, for the benefit of the physicians at the bath.
5. The patient, while at the mineral spring, should be under a more rigid medical discipline.

The discussion of this paper was participated in by Drs. Bruen, Van Bibber, and Kretschman.

DR. DIDAMA, of Syracuse, read a paper on the

#### CLIMATE OF MEXICO.

The paper was based upon somewhat conflicting communications from physicians practising in Mexico.

DR. EDWARD T. BRUEN, of Philadelphia, followed with a paper on

#### THE SOUTHERN ADIRONDACKS,

describing his experience in this locality, giving the results of meteorological observations, and describing the classes of patients likely to be benefited by a sojourn in these regions.

DR. E. A. SCHAUFFLER, of Kansas City, then spoke of

#### THE CLIMATE OF EL PASO, TEXAS.

El Paso is 340 miles south of Santa Fé, and is 3700 feet above the sea level. The soil is sandy and porous.

The great advantages of this climate is the mild winter and the small rainfall. The annual mean temperature is 61.59°. The winter mean is 47.9°. The average rainfall for several years has been about twelve inches. The winter months are the driest of the year. The air is exceedingly bracing and tonic.

DR. A. N. BELL, of New York, read a paper describing

#### SOUTHERN PINE PARKS,

a new health resort of North Carolina.

#### AFTERNOON SESSION.

The following were elected

#### OFFICERS FOR THE ENSUING YEAR:

*President.*—Dr. F. Donaldson, of Baltimore.

*Vice-Presidents.*—Drs. V. Y. Bowditch, of Boston, and Roland G. Curtin, of Philadelphia.

*Secretary and Treasurer.*—Dr. J. B. Walker, of Philadelphia.

*Additional Member of Council.*—Dr. F. C. Shattuck, of Boston.

A communication was received from the Committee of the American Surgical Association, inviting the Society to appoint a Committee to confer with like committees from the other special societies in reference to the organization of a

#### CONGRESS OF AMERICAN PHYSICIANS AND SURGEONS.

The communication was approved, and the following committee was appointed: Drs. A. L. Loomis, of New York; F. Donaldson, of Baltimore; F. C. Shattuck, of Boston; E. T. Bruen, of Philadelphia; and W. W. Johnston, of Washington.

DR. H. B. BAKER, of Lansing, Mich., then read a paper on

#### THE CAUSATION OF PNEUMONIA.

The atmospheric condition, he said, which is most closely associated with pneumonia, is the night azone, but although this is perhaps one factor, it is probably not the controlling force. He believed that the statistics which he presented showed that the causation of the disease is absolutely controlled by the meteorological conditions.

DR. J. H. MUSSER, of Philadelphia, then offered some SUGGESTIONS REGARDING THE PREVENTION OF PHTHISIS IN MILL HANDS.

He showed that states of ill-health are common in this class of artisans, and asserted that it is very largely due to an inadequate supply of food, which is improperly selected and prepared, and to carelessness in attention to digestion. This cause obtained more largely than bad hygienic surroundings, or the occupation itself. If this be true, the remedy is to have the system of the Willimantic Cotton Company used by all mill proprietors. That company has proven by experience and careful calculation that it pays them in quality and quantity of work done to supply milk to their boys and bouillon to their women twice daily, and that the health of the operatives is promoted, and their lives prolonged thereby.

DR. C. L. DANA, of New York, read a paper on the INFLUENCE OF HIGH ALTITUDES WITH REFERENCE TO NERVOUS AFFECTIONS.

The observations had been made by physicians at Colorado Springs. The climate seemed to be unfavor-

able for nervous affections in children, such as chorea. It seemed to be bad for nervous affections in women. High altitudes do not necessarily injure epileptics. In chronic obstinate insomnia in anæmia and malnutrition, the high altitude appears to be beneficial. In chronic affections of the cord the effects seem to be unfavorable.

He thought that the climate tended to produce lithæmia and arthritism, with consequent irritation of the nervous system. The best results are obtained in debility, neurasthenia, and especially in anæmia, insomnia, and melancholia associated with anæmia and malnutrition.

A vote of thanks was extended the College of Physicians of Philadelphia for the use of its Hall, and the Association adjourned *sine die*.

#### NEW YORK SURGICAL SOCIETY.

*Stated Meeting, April 15, 1886.*

THE PRESIDENT, CHARLES MCBURNEY, M.D.,  
IN THE CHAIR.

#### COLLES'S FRACTURE.

DR. L. A. STIMSON presented a woman twenty-three years old who received a Colles's fracture of the right wrist four weeks ago to-day, for which she had been treated in the Presbyterian Hospital. The lower fragment was markedly displaced upward and backward in the usual manner. The displacement was reduced by traction on the hand and coaptative pressure, and the limb kept between anterior and posterior splints, of which the latter reached to the wrist, and the former to the metacarpo-phalangeal line, and bore at its distal extremity a woollen bandage placed obliquely, over which the fingers were flexed, and by which the hand was kept in dorsal flexion. Since the last meeting of the Society, three weeks ago, he had taken pains to have the fingers freely and frequently moved; this motion had at no time caused pain. The limb was taken from the splints this morning. The reduction was complete; even the styloid process of the radius was as low as on the other wrist; a result made possible, in his opinion, only by the absence of notable crushing of the spongy bone at the time the fracture was received. The fingers could be easily and freely flexed and extended; the range of voluntary motion of the thumb was less than normal; passive pronation and supination were possible through an arc of nearly seventy degrees. The case, he thought, proved that voluntary and passive movements of the fingers during the treatment of Colles's fracture did not always cause rigidity of their joints.

#### FRACTURE OF THE LOWER END OF THE RADIUS.

DR. R. J. HALL presented three of the patients whose cases he reported in a paper read at the last meeting of the Society, being the only ones who had responded to his request that they should be present at the meeting to-day. One was a boy, in whom the result was reported as perfect; in the second, a fracture eight weeks old, there was considerable rigidity of the fingers and limitation of motion, but the position was good; the case had been reported among the imperfect results in the paper. The third patient was also one in whom the result had not been reported as perfect, as there was



slight lateral displacement of the hand, but perfect motion of the fingers and wrist.

#### EPIPHYSARY EXOSTOSIS AT THE UPPER INNER PORTION OF THE HUMERUS.

DR. L. A. STIMSON presented a man forty-five years old, with a large epiphysary exostosis at the upper inner portion of the right humerus. The right humerus was three-fourths of an inch longer than the left; the bones of the forearm and of the lower extremities were of the same length on the two sides. Dr. Stimson asked whether the members of the Society had ever met with a similar coincidence. It is known that the greater part of the growth of the humerus in length takes place at its upper end, and also that these exostoses are outgrowths from the epiphysary cartilage, which is the active agent in effecting growth in length. It seemed to him, therefore, that the two abnormalities in this case could be referred to one cause, exaggerated functional activity of the upper epiphysal cartilage.

The individual was unaware of the presence of this exostosis until his attention was called to it a fortnight ago, six weeks after he had received a violent blow upon the outer side of the same arm at its middle, which was said to have caused a fracture of the bone, but of which no sign was then present.

DR. MARKOE, and other members of the Society who examined the patient, remarked that the growth could be felt very distinctly.

THE PRESIDENT inquired whether the exostosis caused the patient any inconvenience.

DR. STIMSON replied in the negative.

DR. MARKOE remarked that it was altogether probable that, as the exostosis continued to grow, it would offer a mechanical obstacle to the movement of the shoulder-joint.

DR. STIMSON thought growth had ceased, for the man was forty-five years of age.

DR. MARKOE said that was possibly true, but in the large majority of cases of exostoses in the neighborhood of the knee-joint the history was one of progressive increase. Some years ago he presented the specimens taken from a patient in whom the tumor had been growing from the upper end of the tibia for about fourteen years, projecting into the popliteal space; its mechanical interference with flexion and the return circulation gradually increased, finally making it necessary to perform excision (which was done ten or eleven years ago). There had been no further trouble. At the time of the operation, the patient was thirty-seven years old. The other cases which he had seen, and which he had made the basis of a paper not long ago, were of a more recent date, although of several years' standing, and the tumors were all growing at the time he operated.

DR. STIMSON thought that in some cases the growth took place from cartilage remaining at the tip of the process.

DR. MARKOE said they were developed in the neighborhood of the epiphysal cartilage, but whether the cartilage had anything to do with the growth of the tumor, he could not say. In some the development was so far from the epiphysal line that he had doubts whether in those cases it took place from the cartilage. In one case, the distance between the growth and the epiphysal line was three fingers' breadth.

DR. STIMSON remarked that the explanation which he had seen was that they grew from a separate portion of cartilage.

DR. MARKOE: Yes, from a remaining rudimentary portion.

DR. HALL mentioned a case in which a patient sustained an injury from earth falling upon him, and while under treatment a large tumor was discovered, never previously noticed by the patient, on the inner side of the thigh, between the vastus internus and the adductors. As it was movable, it was thought to be broken off, but this supposition proved to be erroneous, as movement was permissible through its very thin attachment to the linea aspera. Its base was about five inches in length; it was leaf-like in shape, and had developed in the intermuscular septum, being one of those rather rare cases of exostosis aponeurotica. The superficial femoral artery lay in a groove on its posterior surface.

DR. STIMSON had seen the report of a similar case—one of exostosis with a broad implantation on the inner side of the lower end of the femur, which had been broken off by the woman crossing her limbs.

DR. MARKOE said there were specimens in the New York Hospital museum, and also one in the museum of the College of Physicians and Surgeons, of bony tumors with broad attachments developed from the lower portion of the linea aspera. But these cases were altogether different. He did not think they developed from cartilage at all.

#### ANEURISM OF THE EXTERNAL ILIAC.

DR. T. M. MARKOE presented a man who had entered the New York Hospital, in March, 1886, having a short time before noticed a large tumor in the upper part of the femoral region. The tumor was a very actively pulsating aneurism, extending apparently a certain distance underneath Poupart's ligament, and causing considerable oedema and pain by pressure upon the femoral vein and nerves. There was no apparent clot in the cavity. The interference with the return circulation and the pain became so marked that an operation was called for, and he ligated the external iliac artery on March 11th. Drainage by a leash of catgut was employed, and the wound rapidly healed without suppuration. The case was interesting in the fact that slight pulsation had returned at the end of a week. It had increased somewhat during the last ten days. Of one hundred cases of aneurism so treated, reported by Norris, pulsation returned in only six cases. The patient stated that the tumor was decreasing in size, and that he was free from pain. The epigastric artery was noticed during the operation to be very large.

DR. MARKOE then read a paper on.

#### FIBRO-SARCOMA OF THE MEDIAN NERVE.

THE PRESIDENT presented a tumor which he had removed in February last from a patient aged twenty-seven years, who said he had noticed a small tumor on the inner side of the right arm six years ago. The tumor had gradually grown without giving any special inconvenience or pain until a month before the operation, when he complained of slight pain in the elbow and forearm. Pressure upon the tumor produced sharp, tingling pains in the hand. The growth was situated on the inner side of the upper third of the right arm, and, when cut down upon, it was found to be fusiform

in shape, and to have deep attachments, being apparently a tumor of the median nerve. On cutting through its capsule the fibres of the nerve could be seen very distinctly spread over its surface, but the major portion of the tumor lay posterior to the nerve. The entire growth with its sheath was removed, with no further injury of the nerve than the division of a few of its strands which were connected with the tumor. A part of the wound was united with catgut, and healed readily, the patient having no further inconvenience than some tingling sensations in the hand and forearm and desquamation of the epithelium of the hand, which disappeared at the end of the third week. When he examined the patient recently the only difference observable between the upper extremities was a slightly diminished grasp in the right hand. The motions were perfect. The specimen was examined microscopically by Drs. Peabody and Ferguson, who pronounced it a fibro-sarcoma.

DR. GERSTER asked whether, in view of the fact that there was liability to early recurrence of the growth, it would not have been justifiable to resort to a more radical operation.

THE PRESIDENT replied that it would have been necessary to remove at least two inches and a half of the nerve in order to feel assured of the total extirpation of the growth, which would have rendered it impossible to restore the continuity of the nerve; nor should he want to amputate the arm as a primary operation. The growth had required six years to attain its present size, and, should it recur, there would then be time to consider a radical operation, but he did not think a radical operation would have been justifiable in the first place.

## CORRESPONDENCE,

### ERROR IN STATEMENT OF RESULTS OF BATTEY'S AND TAIT'S OPERATIONS CORRECTED.

To the Editor of THE MEDICAL NEWS,

SIR: In his "Note on Removal of the Uterine Appendages" (page 456, current volume of THE MEDICAL NEWS), Mr. Lawson Tait inadvertently says of my original operation: "It was first performed by Battey, with a fatal result, on August 17, 1872, and, therefore, if proper names are to be given to the operations, it deserves to have Dr. Battey's name attached to it."

This case has been so often reported to medical societies, and cited in the journals, in London as well as in America, as a *successful* case, that I can hardly suppose Mr. Tait to be ignorant of the fact. I therefore accept it as a slip of the pen in the hurry of a busy professional life. I can the more readily do this since, in the same connection he is quite as unhappy in reporting the result of his own case, when he tells us "It was first performed by me on August 1, 1872, with a *successful* result. I am, therefore, entitled to have this operation described by my name."

In the *British Medical Journal* for May 31, 1879, we find from the pen of Mr. Tait the following: "Removal of normal ovaries. As a small contribution to the history of this proceeding, I should like to supplement Prof. Simpson's paper by the statement that I have removed the ovaries for the arrest of hemorrhage in cases of

myoma three times, *in all three with a fatal result*. The dates were August 1, 1872; December 26, 1873; and March 14, 1874. It will thus be seen that this operation was performed in England five days *after* it was first performed in Germany, and sixteen days *before* it was performed by Dr. Battey. . . . That this operation will prove a great addition to surgery I have no doubt. With our improved methods of operation I believe that at least two, possibly all three, of my cases would recover now, if I had them over again."<sup>1</sup>

To Mr. Tait's claims of priority I have nothing to say. For more than six years (from September, 1872, to May, 1879), during which this subject was actively discussed in medical societies and medical journals, his voice was not heard. There seems little disposition manifested anywhere to reopen the case now for his benefit.

ROBERT BATTEY, M.D.

ROME, GEORGIA, May 6, 1886.

## NEWS ITEMS.

OFFICERS OF THE INTERNATIONAL MEDICAL CONGRESS.—The Executive Committee of the International Congress, we are informed, have finally elected the following officers for the Washington Congress:

*President*.—N. S. Davis, of Chicago.

*Vice-Presidents*.—W. O. Baldwin, of Montgomery, Ala.; William Brodie, of Detroit; W. W. Dawson, of Cincinnati; E. M. Moore, of Rochester, N. Y.; T. G. Richardson, of New Orleans; L. A. Sayre, of New York; J. M. Toner, of Washington; the President of the American Medical Association, the Surgeon General United States Army, Surgeon General United States Navy, Supervising General Marine-Hospital Service.

*Secretary-General*.—J. B. S. Hamilton, U. S. Marine-Hospital Service.

*Treasurer*.—E. S. F. Arnold, of New York.

*Chairman Finance Committee*.—Frederick S. Dennis, of New York.

*Presidents of Sections*:

*Medicine*.—A. B. Arnold, of Baltimore.

*Surgery*.—William T. Briggs, of Nashville.

*Military and Naval Surgery*.—H. H. Smith, of Philadelphia.

*Obstetrics*.—Delaskie Miller, of Chicago.

*Gynecology*.—James H. Harrison, of University of Virginia.

*Anatomy*.—William H. Pancoast, of Philadelphia.

*Physiology*.—J. H. Callender, of Nashville.

*Pathology*.—A. B. Palmer, of Ann Arbor.

*Diseases of Children*.—J. Lewis Smith, of New York.

*Ophthalmology*.—E. Williams, of Cincinnati.

*Otology*.—S. J. Jones, of Chicago.

*Laryngology*.—W. H. Daly, of Pittsburg.

*Dermatology and Syphilis*.—A. R. Robinson, of New York.

*Hygiene*.—Joseph Jones, of New Orleans.

*Collective Investigation, etc.*—H. O. Marcy, of Boston.

*Nervous Diseases*.—John P. Gray, of Utica.

*Dental and Oral Surgery*.—J. Taft, of Cincinnati.

THE ENGLISH HYDROPHOBIA COMMISSION.—The Committee appointed by the Local Government Board to inquire and report upon M. Pasteur's method of pre-

<sup>1</sup> The Italics are mine.

venting the development of rabies in persons bitten by rabid dogs, comprises Sir Henry Roscoe, M. P., Sir James Paget, Bart., Dr. Richard Quain, F.R.S., Professor Burdon Sanderson, F.R.S., Dr. Lauder Brunton, F.R.S., and Mr. Fleming, Principal Veterinary Surgeon of the Army. Mr. Victor Horsley, M.B., F.R.S., Professor-Superintendent of the Brown Institute, has been requested to act as Secretary. The Committee is unpaid, but we understand that a sum not exceeding £300 has been placed at its disposal, to defray the expenses of the inquiry. Sir Henry Roscoe, Professor Burdon Sanderson, Dr. Lauder Brunton, and Mr. Victor Horsley are now at work in Paris.

**THE TRANSLATION INTO JAPANESE OF AGNEW'S PRINCIPLES AND PRACTICE OF SURGERY.**—From an advertisement before us, we learn that Dr. D. Hayes Agnew's work on surgery is about to be published in Japanese. The translation is being made by Dr. M. Toyabe, and will be revised by Dr. Matsuyama Hoan. This large work will be published in seven volumes, of about 300 pages each, at a subscription price of one *yen* per volume in advance; the fixed price after publication to be ten *yen* (\$8.50), office of publication is that of the *Tôkyô Jiji Shinshi* (*Tôkyô Medical Journal*).—*Sei-i-Kwai Medical Journal*, April, 1886.

**QUARANTINE IN THE SOUTH.**—The Governor of Louisiana has issued a proclamation establishing a quarantine to take effect May 10, against all vessels sailing from inter-tropical American and West Indian ports and arriving at the Mississippi quarantine station.

**FOOD FOR THE POOR.**—The Baroness Burdett Coutts, Lady Wolseley, and others, have started "scrap" carts, which collect broken food in Belgravia and Mayfair. It is carefully cooked and made into soup, stews, pies, and puddings, and sold at a penny a dish to the poor.

**AUSTRIAN HYDROPHOBIC COMMISSION.**—Dr. Frisch, the delegate sent by the Austrian government to Paris to investigate the report upon M. Pasteur's system of treatment for hydrophobic disease, in a public lecture has advised the medical profession of the empire to adopt the French savant's report.

**CHOLERA INOCULATION IN SPAIN.**—The Spanish Sanitary Council has authorized the practice of inoculation discovered by Dr. Ferrán in the event of a recurrence of cholera in Spain.

## NOTES AND QUERIES.

### THE ANALGESIC ACTION OF THEINE.

To the Editor of THE MEDICAL NEWS,

SIR: I have no desire to monopolize much of your valuable space, but Dr. Castle's note on "The Analgesic Action of Theine," in your issue of the 24th inst., is such a strange misconception of the cardinal intent of my paper on the same subject in your previous issue, that I think it needs a brief reply.

When Dr. Castle says that some of the cases of neuralgia which were reported to me as having been relieved by theine, "might have been similarly relieved by the injection of distilled water," or "by the simple puncture with a needle," he makes a statement, which, instead of being *apropos* to my inquiry, as he believes it to be, is so far from it that no possible line of continuity can be traced between the two. The purpose of my paper is to elucidate the fact that physiological experimentation had shown that theine possesses the inherent power of producing anesthesia independent of any analgesic effect it might have in disease. The question which

arose then was not whether "the injection of distilled water," or "the puncture with a needle," or the application of anything else "might" relieve some or all of the cases to which theine was administered; but whether it could be demonstrated that the anæsthetic property of the latter was sufficiently powerful to accomplish this same object. No one who reflects on the import of the cases there detailed will, I think, deny that theine was remarkably prompt and efficient in performing its task. The broader question whether theine is of superior value in the treatment of neuralgia, remains to be finally decided by the therapeutic law of the "survival of the fittest."

Moreover, by way of digression, I wish to remark, that there exists a delusion among some, from which I do not know whether Dr. Castle is quite free, that the "injection of water," and "the simple puncture with a needle," which are occasionally successfully resorted to in the treatment of pain, are equivalent to doing nothing—in fact, that they are harmless but effective *placebos*. Yet any one who is acquainted with physiological laboratory work knows very well that water, especially if it is distilled, is highly irritating and poisonous to exposed living organs, and certainly no one will ever suspect that the puncture of a needle is very soothing to any tissue; hence there can be no doubt that these agents act in a way similar to that of the hot iron and blister (unless the puncture extends through the sheath of the nerve and removes some mechanical distention), and have nothing in common with the pain-relieving action of theine.

In conclusion, I wish to add that it was my original intention to discuss the points raised by Dr. Castle, but on account of the size which the paper had already attained, they were omitted. I trust, however, that their true bearing will now be fully understood.

Very respectfully yours,  
THOMAS J. MAYS.

April 26, 1886.

### OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT OF THE U. S. ARMY, FROM MAY 4 TO MAY 10, 1886.

TILTON, HENRY A., *Major and Surgeon*.—From Department of the East to Department of California.—S. O. 106, A. G. O., May 6, 1886.

BROOKE, JOHN, *Major and Surgeon*.—From Department of California to Department of the East.—S. O. 106, A. G. O., May 6, 1886.

COMEGYS, EDWARD T., *Captain and Assistant Surgeon*.—From Department of the Missouri to Department of the East.—S. O. 106, A. G. O., May 6, 1886.

APPEL, AARON H., *Captain and Assistant Surgeon*.—From Department of the East to Department of the Missouri.—S. O. 106, A. G. O., May 6, 1886.

WILSON, WM. J., *Captain and Assistant Surgeon*.—Died May 2, 1886, at Plattsburg Barracks, New York.

### OFFICIAL LIST OF CHANGES IN THE MEDICAL CORPS OF THE U. S. NAVY FOR THE WEEK ENDING MAY 8, 1886.

KITE, ISAAC, *Assistant Surgeon*.—Ordered to Naval Hospital, Brooklyn.

SIMON, W. J., *Passed Assistant Surgeon*.—Ordered for temporary duty to the Naval Academy, Annapolis.

LIPPINCOTT, GEO. C., *Passed Assistant Surgeon*.—Ordered for temporary duty to the Naval Academy, Annapolis.

### OFFICIAL LIST OF CHANGES OF STATIONS AND DUTIES OF MEDICAL OFFICERS OF THE U. S. MARINE-HOSPITAL SERVICE, FOR THE WEEK ENDING MAY 1, 1886.

MAGRUDER, G. M., *Assistant Surgeon*.—Appointed an Assistant Surgeon April 24, 1886; assigned to temporary duty at Norfolk, Va., April 26, 1886.

THE MEDICAL NEWS will be pleased to receive early intelligence of local events of general medical interest, or of matters which it is desirable to bring to the notice of the profession.

Local papers containing reports or news items should be marked. Letters, whether written for publication or private information, must be authenticated by the names and addresses of their writers—of course, not necessarily for publication.

All communications relating to the editorial department of the NEWS should be addressed to No. 1004 Walnut Street, Philadelphia.